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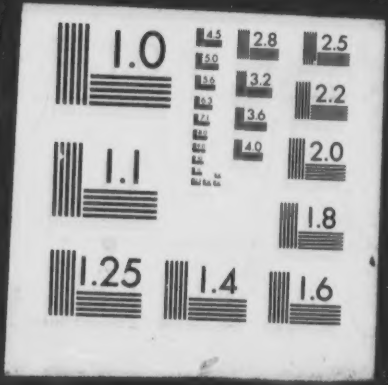
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U.S. Environmental Protection Agency, Atlanta, Ga. Region IV

19 May 78

DRAFT
ENVIRONMENTAL IMPACT STATEMENT
IDEAL BASIC INDUSTRIES

CEMENT PLANT
THEODORE INDUSTRIAL PARK, ALABAMA

LIMESTONE QUARRY
MONROE COUNTY, ALABAMA

APPENDICES
VOLUME IV

APPENDIX C IMPACTS

APPENDIX D MITIGATING MEASURES

APPENDIX E ALTERNATIVES

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, REGION IV

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Ideal Basic Industries proposes to construct a new cement plant in Theodore Industrial Park near Mobile, Alabama and a supporting limestone quarry in Monroe County Near Monroeville, Alabama. This impact statement addresses the existing air quality in Mobile County and Theodore Industrial Park and the natural environment of the proposed quarry sites. Air emissions at the proposed plant site are modeled and their impacts are projected for the area. The impact of constructing an access road across wetlands are discussed. Mitigative measures to reduce these impacts are presented as well as alternative locations.

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APPENDIX C. IMPACTS

INTRODUCTION

This impacts section identifies, evaluates, and describes both the beneficial and detrimental environmental impacts associated with the Ideal Basic Industries proposed project.

The impacts addressed are only those which will be mitigated but not completely eliminated by the environmental safeguards to be taken as presented in Project Description. These impacts have been classified and evaluated according to the following criteria:

1. Primary impacts (direct) are those attributable to the action of process wastes, demands upon resources, accidents or abnormal conditions of operations, and initial project construction. Primary impacts are associated with the project site and local area.

2. Secondary impacts (induced) are those attributable to some indirect demand or impact of the project upon the environment, society, or economy which occurs or becomes important at some different point in time or space or in some other sector of the environment, society, or economy. Secondary impacts are associated with the overall region surrounding the project area.

3. Magnitude factors may be described through normal parameters of quantification based on some measurable physical property of the impact.
   * High magnitude--impacts involve substantial quantities and have extensive effects.
   * Moderate magnitude--impacts involve moderate quantities and may have extensive effects.
   * Low magnitude--impacts involve small quantities and do not have extensive effects.

4. Significance factors require consideration of the relative importance of the magnitude of an impact in relation to its effects on the area and the residents surrounding the proposed facility. Determination of impact significance involves a judgmental evaluation of the described effects.
   - * High significance--impacts are of high relative importance and require special consideration.
   - * Moderate significance--impacts are relatively important and may require special consideration.
   - * Low significance--impacts are not considered relatively important and do not require special consideration.

5. Duration indicates the persistency of the impact. Long-term impacts are those which persist for more than several years and ordinarily will last for the expected life of the project. Short-term impacts will last for several years or less.

6. Reversibility factors may be described in relation to the ability of specific disturbed conditions to return to existing or equivalent conditions, levels, appearances, or usages without extensive assistance by man.

7. Avoidability characteristics are assessed on the basis of whether or not the impact could be completely eliminated by some alternative action. Most impacts are considered unavoidable, assuming that the proposed project is to be constructed and operated. Therefore, only the avoidable impacts are so classified in the text.

This appendix assesses the critical and apparent impacts and also mentions impacts of minor importance. Impacts of minor importance are rated as "negligible" in the text and have been included to show that they were considered in the impact assessment.

PLANT SITE

AIR QUALITY

CONSTRUCTION IMPACTS

Various construction activities associated with the proposed Ideal Basic Industries development, including land clearing, heavy machinery operation, truck traffic, and road construction, will generate air pollutants. Because of the nature of these operations, emissions are extremely difficult to quantify accurately. Thus, this discussion addresses primarily the qualitative air pollution aspects of these construction activities.

Fugitive Dust

The most significant air pollutant generated during construction operations will be particulate matter, in the form of fugitive dust. Heavy machinery operations, including road construction, vehicular and heavy machinery traffic along unpaved roads, grading, excavating and land clearing, will be the primary sources of fugitive dust. The quantities of dust emitted will be dependent on a number of factors, including frequency of operations, specific operations conducted, weather, and soil conditions. Some construction operations, such as land clearing and grading, will be intermittent and of short duration. In addition, the majority of dust particles are expected to be large and settle out close to the source (Kosky and Wanielista, 1975).

Some of the dust, however, will remain suspended in the atmosphere. Suspended dust emissions from heavy construction operations have been generally estimated at 2.7 metric tons per hectare (1.2 tons per acre) per month of activity (U.S. EPA, Office of Air Quality Planning and Standards, 1975). This impact is felt to be of moderate magnitude due to the quantities of dust that will be emitted, but of low significance in the area/region due to its short-term and reversible nature.

Burning of Vegetative Wastes

The impact of burning the land clearing wastes will depend on the amount of wastes which are burned rather than chipped or hauled to a landfill for burial. The "worst case" impact would occur if the other two methods are found to be impractical or undesirable and all the wastes are burned. As described in Appendix A, Project Description, burning will be performed with an air-blower type pit burner so that there will be better combustion efficiencies and less smoke than in typical "open burning."

Burning will be conducted as needed during the first three months of construction. Short-term impacts mainly from the smoke emitted can result from these operations. The local and state air pollution agencies require that burning be conducted only during periods of favorable dispersion conditions which will also minimize potential impacts. Under these conditions, the resulting impacts on air quality should be of low significance and low magnitude. In addition, the impact would be reversible and of short duration. (This impact may be avoided by chipping or by landfilling all vegetative waste).

Vehicular Exhausts

Exhaust from heavy machinery and truck traffic will be a minor source of air pollutants, mainly carbon monoxide, particulate matter, nitrogen oxides, hydrocarbons, and sulfur oxides. These exhaust emissions will be of relatively small quantities because of the limited amount of construction traffic expected, and are expected to have an impact of negligible significance and magnitude.

In summary, the heavy construction activities are expected to have a short-term impact in the immediate vicinity of the plant site, with the primary impact on suspended particulate matter levels. During clearing and grading operations, which will require approximately 3 months, the construction impacts on air quality will be greater than during other phases of construction due to the burning of vegetative wastes. Suspended particulate matter levels are anticipated to increase during construction, both on-site and in the vicinity. These impacts are expected to be of low significance. Secondary impacts are discussed in the Ecology and Socioeconomics sections.

OPERATIONAL IMPACTS

Emissions

Operational impacts of the cement plant will be caused by air pollutants emitted from the various manufacturing processes. Expected emissions of particulate matter, sulfur dioxide, hydrocarbons, nitrogen oxides, and carbon monoxide were quantified in Appendix A, Project Description. Emissions of particulate matter and sulfur dioxide have been evaluated for their air quality impacts by estimating ambient air concentrations of these pollutants through dispersion modeling and comparing these concentrations to the ambient air quality standards and to the 1977 estimated baseline air quality. Quantities of fugitive dust emissions are expected to be negligible because of the high moisture content of the raw materials, the use of water sprays, and a cover over some of the stockpiles.

Suitable dispersion models do not exist for reactive pollutants, such as hydrocarbons and nitrogen oxides, to estimate ambient air concentrations accurately. However, emissions of hydrocarbons from the proposed plant are estimated to be small--7 metric tons (8 tons) per year, and their impact is expected to be of negligible significance and magnitude. Nitrogen oxides will be emitted in significant quantities from fuel-burning sources at the plant, an estimated 3,237 metric tons (3,568 tons) per year. The impact of these emissions was evaluated by application of a long-term, non-reactive dispersion model and a qualitative evaluation of the results. Carbon monoxide, which will be emitted in small quantities, 25 metric tons (28 tons) per year, is expected to have an impact of negligible significance on the carbon monoxide air quality levels in the vicinity of the plant site.

Prevention of Significant Deterioration Analysis

A comprehensive evaluation of the particulate matter and sulfur dioxide air quality impact of the proposed cement plant was performed as part of the Prevention of Significant Deterioration (PSD) review required in the Code of Federal Regulations, Title 40, Part 52, Subpart 52.21. The review also addresses the application of Best Available Control Technology (BACT) for the control of emissions from the proposed plant. This PSD review is necessary prior to issuance of an approval to construct the cement manufacturing facility. A complete copy of the PSD application is available for review from the U.S. EPA Region IV office in Atlanta, Georgia, and a copy of the agency approval is included in the Permit and Approval section of the Summary Document.

The proposed cement plant will utilize air pollution controls, including baghouses and relatively low sulfur content fuel (1.5 percent maximum by weight) to reduce the potential emissions of particulate matter and sulfur dioxide, respectively. These controls have been reviewed and are considered BACT, pending review of the specific equipment selected and the final design plans.

PSD regulations require that the impact of the particulate matter and sulfur dioxide emissions from the proposed facility be determined and reviewed for compliance with the following standards:

1. Ambient air quality standards (AAQS) must not be exceeded at any location as a result of the proposed new source. These standards pertain to the following air quality measures:

   Sulfur dioxide
   - (a) annual arithmetic mean concentration;
   - (b) second highest 24-hour concentration in an annual period;
   - (c) second highest 3-hour concentration in an annual period.

   Suspended particulate matter
   - (a) annual geometric mean concentration; and
   - (b) second highest 24-hour concentration in an annual period.

2. Allowable federal increments in air pollutant concentrations must not be exceeded. These increments represent fixed limits upon the amounts by which the air quality measures listed above can change relative to 1974, the baseline year. All sources of air quality degradation are included, not just the proposed new source. As in the case of AAQS, the new source must be shown not to violate the allowable increment at any location, under expected worst-case meteorological conditions. The purpose of the increments is to prevent significant air quality deterioration in areas where the 1974 ambient concentrations were substantially below the applicable standards.

The maximum concentration estimates for 1980 with the proposed plant in operation were derived by assuming that all sources in Mobile County were emitting at allowable or permitted rates, except for a few sources which theoretically could not emit up to the allowable limit due to process design or other limitations. However, it is expected that many sources in Mobile County will emit quantities of particulate matter and sulfur dioxide below the allowable limit because of the application of control equipment or use of low sulfur fuels.

In addition, the estimated quantities of emissions from the proposed plant used for the modeling analysis were based upon a worst-case design condition of separate clinker cooler exhausts. Since the analysis was performed, Ideal Basic Industries has rejected this alternative. Therefore, emission rates have been reduced from 608 metric tons (670 tons) per year to 504 metric tons (555 tons) per year of particulate matter and from 6,978 metric tons (7,694 tons) per year to 6,372 metric tons (7,024 tons) per year of sulfur dioxide. In addition, no reduction was assumed for the sulfur dioxide emissions, even though there is strong evidence to expect up to 75 percent reduction (U.S. EPA, 1975) due to contact of the exhaust gases with the alkaline raw materials (see the Air Quality section of Appendix A, Project Description). Because of these factors, actual maximum concentrations in 1980 with the proposed plant in operation are expected to be lower than those shown in Table C.1.

Isopleths of annual average ground-level sulfur dioxide concentrations predicted for 1980 are shown in Figure C.1 (without the proposed plant in operation) and Figure C.2 (with the proposed plant in operation). These predicted concentrations are based on allowable emissions. Figure C.3 shows isopleths of the incremental contributions to the annual average sulfur dioxide concentrations from the proposed cement plant.

Isopleths of annual average ground-level suspended particulate matter concentrations for 1980, based on allowable emissions from all sources in Mobile County, are shown in Figure C.4 (without the proposed plant) and in Figure C.5 (with the proposed plant in operation). Isopleths of the incremental contributions to the annual average particulate matter concentrations due to operation of the proposed plant are shown in Figure C.6. The impacts of the particulate matter and the sulfur dioxide concentrations due to the cement plant are very slight in relation to Ambient Air Quality Standards.

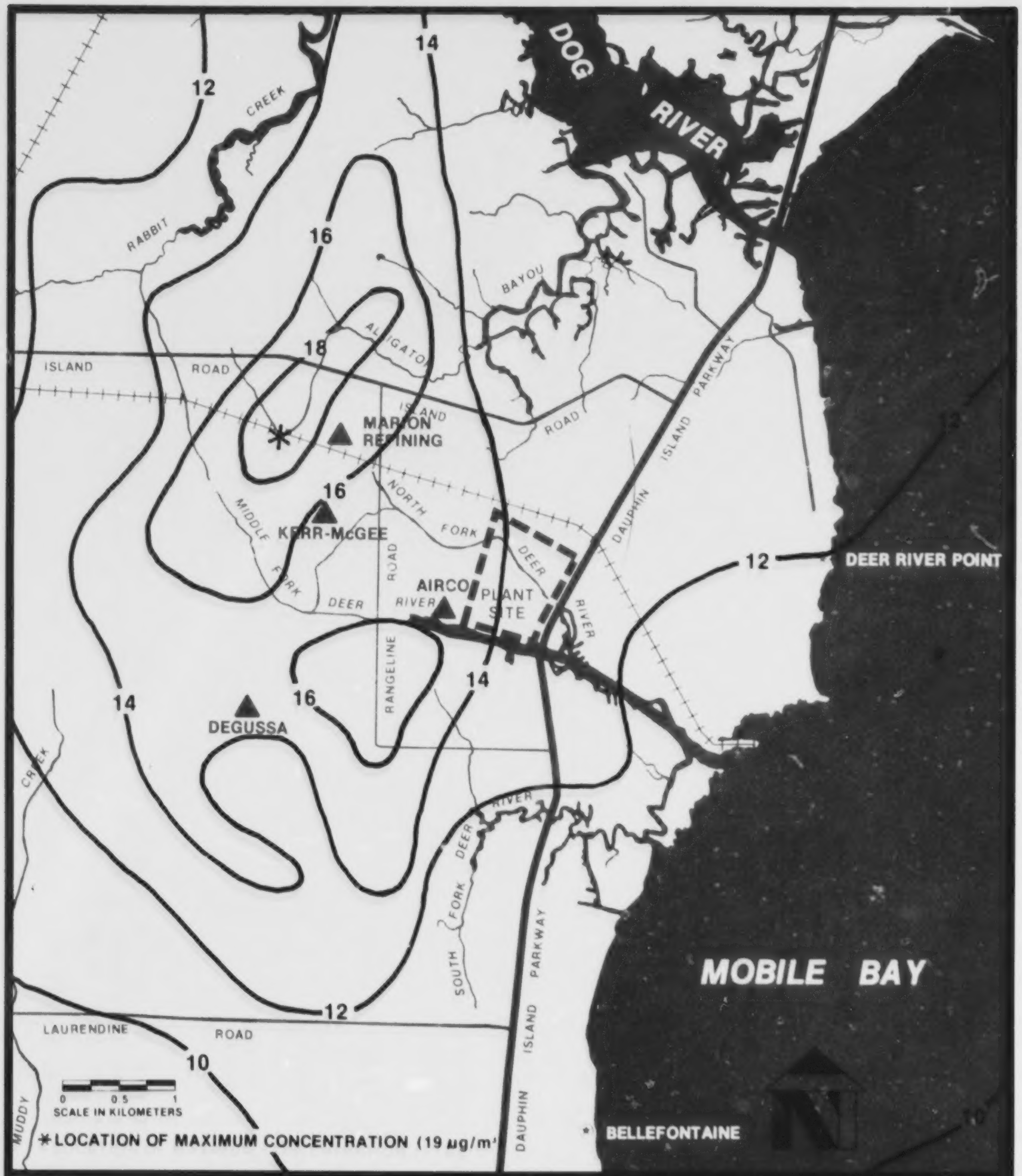
Due to the present level of methodology, isopleths of the short-term concentrations (24-hour for particulates, 24-hour and 3-hour for sulfur dioxide) are not available. Instead, a grid of receptor points was established in the Theodore Industrial Park area and the highest, second highest concentrations for each receptor were noted. (The "highest, second highest" relates to the ambient air quality standard of "not to be exceeded more than once per year." Each receptor's position was modeled for 5 years of concentrations and the highest of all the years' second highest concentrations are shown.) This information is depicted in Figure C.7 (sulfur dioxide) and in Figure C.8 (particulate matter). The values shown will not occur simultaneously since they represent the concentration at one receptor for one day out of 5 years. Figures C.9 and C.10 show the highest, second highest 24-hour concentrations of sulfur dioxide and particulate matter, respectively, expected to exist at each location in an annual period (from the cement plant only).

Table C.1. Summary of PSD Evaluation Results for the Proposed Ideal Basic Industries Cement Manufacturing Plant

	Ambient Ground-Level Concentration (ug/m^3)				
	Sulfur Dioxide			Suspended Particulates	
Emission Situation	Annual Arithmetic Mean	Second Highest 24-Hour Period	Second Highest 3-Hour Period	Annual Geometric Mean	Second Highest 24-Hour Period
POINTS OF MAXIMUM CONCENTRATION					
1980 With Ideal *	20	90	315	46	149
Percent of Standard	25%	25%	24%	77%	99%
Ideal Impact(Contribution)	<1	28	146	2	0
POINTS OF MAXIMUM DEGRADATION					
1974 Baseline	8	10	32	44	45
1980 With Ideal †	20	90	315	44	68
Degradation	12	80	283	0	23
Increment Remaining	8	11	229	19	14
Percent of Increment Remaining	40%	12%	45%	100%	38%
Ideal Impact(Contribution)	<1	28	146	<1	21
Percent of Increment	<5%	31%	28%	<5%	57%
MAXIMUM IMPACT OF IDEAL **					
Ideal Impact	1.2	38	199	2	23
Percent of Increment	6%	42%	39%	12%	62%
Increment Remaining	15	53	313	21	26
Allowable Federal Increment	20	91	512	19	37
Federal Primary Standard	80	365	NA	75	260
Federal Secondary Standard	NA	NA	1300	60	150

* Concentrations from all sources at points of maximum impact from all sources combined.
† Concentrations from all sources at points of maximum degradation since 1974.
** Concentrations from Ideal at points of maximum Ideal effect.

Source: Environmental Science and Engineering. Inc.. 1977.



DOG RIVER
RABBIT CREEK
BAYOU
ALLIGATOR
ISLAND ROAD
ISLAND ROAD
DAUPHIN ISLAND PARKWAY
MARION REFINING
KERR-McGEE
MIDDLE FORK DEER RIVER
NORTH FORK DEER RIVER
RANGELINE ROAD
AIRCO
PLANT SITE
DEER RIVER POINT
DEGUSSA
SOUTH FORK DEER RIVER
LAURENDINE ROAD
MUDDY CREEK
MOBILE BAY
BELLEFONTAINE
N
10
12
14
16
18
0 0.5 1
SCALE IN KILOMETERS
✱LOCATION OF MAXIMUM CONCENTRATION (19 µg/m³)

Figure C.1
ISOPLETHS OF PREDICTED ANNUAL AVERAGE GROUND-LEVEL SULFUR DIOXIDE CONCENTRATIONS (ug/m3) WITHOUT THE PROPOSED CEMENT PLANT IN OPERATION, THEODORE, ALABAMA, 1980

SOURCE: Environmental Science and Engineering, Inc., 1977.

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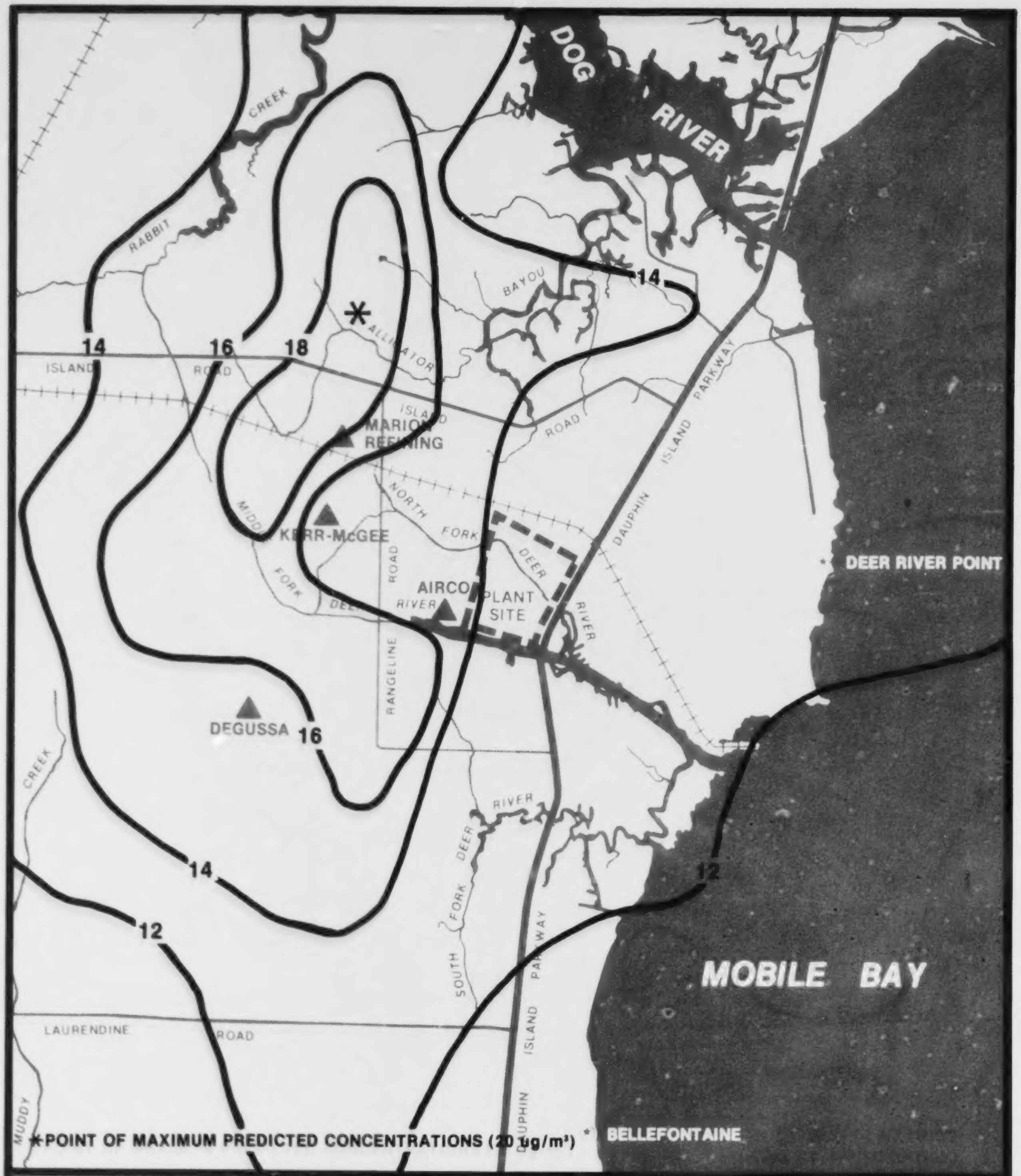
PROPOSED CEMENT MANUFACTURING
PLANT THEODORE INDUSTRIAL PARK
MOBILE, ALABAMA


DOG RIVER
CREEK
RABBIT
BAYOU
ALLIGATOR
14
14
16
18
ISLAND ROAD
ISLAND ROAD
ROAD
DAUPHIN ISLAND PARKWAY
MARION REFINING
KERR-McGEE
NORTH FORK
MIDDLE FORK DEER
AIRCO
RIVER
PLANT SITE
DEER
RIVER
RANGELINE ROAD
DEER RIVER POINT
DEGUSSA
16
14
12
12
RIVER
SOUTH FORK DEER
CREEK
DAUPHIN ISLAND PARKWAY
MOBILE BAY
LAURENDINE ROAD
MUDDY
BELLEFONTAINE

*POINT OF MAXIMUM PREDICTED CONCENTRATIONS (20 ug/m³)

Figure C.2
ISOPLETHS OF PREDICTED ANNUAL AVERAGE GROUND-LEVEL SULFUR DIOXIDE CONCENTRATIONS (ug/m3), WITH THE PROPOSED CEMENT PLANT IN OPERATION, THEODORE, ALABAMA, 1980

SOURCE: Environmental Science and Engineering, Inc., 1977.

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PLANT THEODORE INDUSTRIAL PARK
MOBILE, ALABAMA

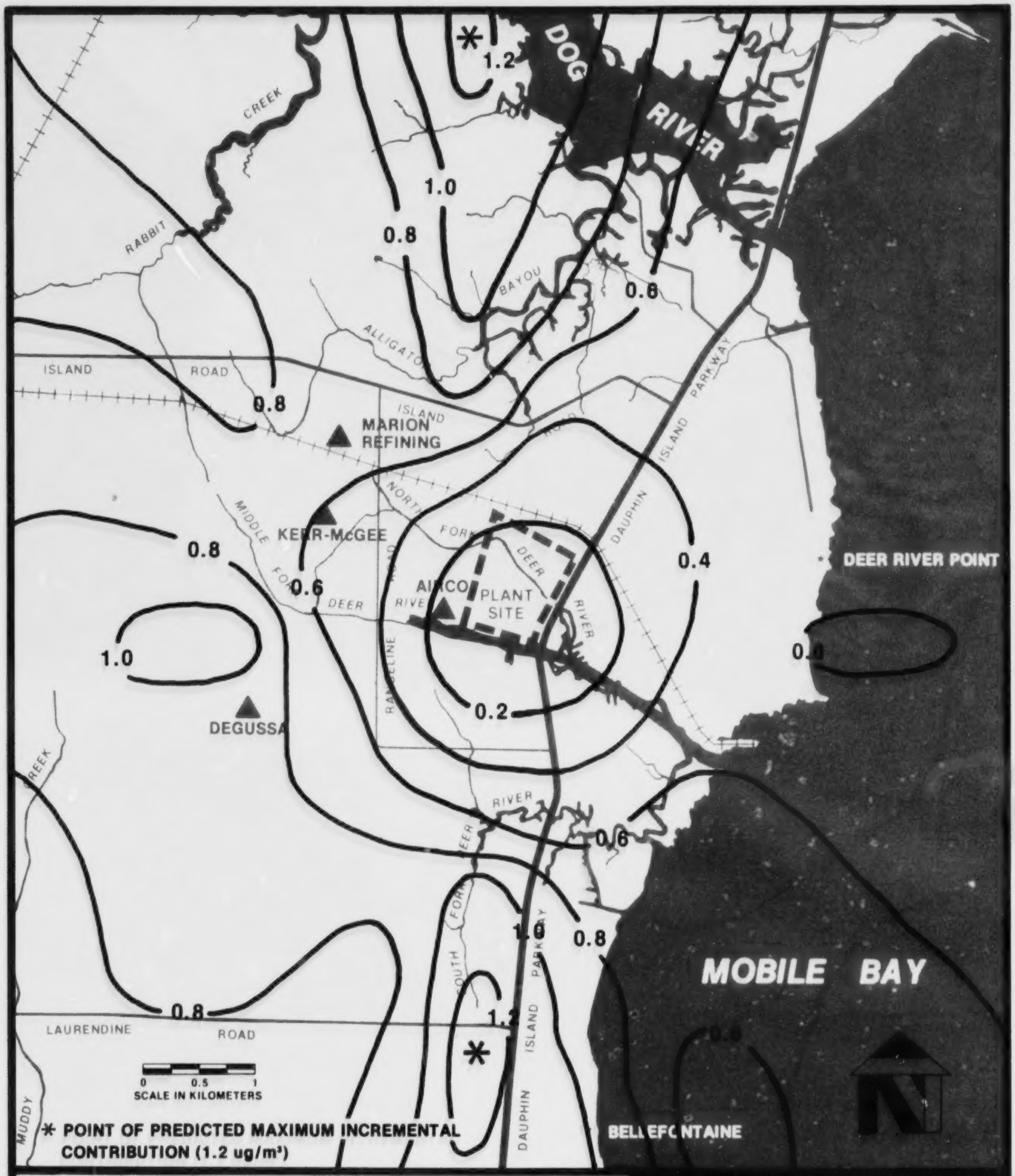
DOG RIVER
1.2
CREEK
RABBIT
1.0
0.8
BAYOU
0.8
ALLIGATOR
ISLAND ROAD
ISLAND ROAD
PARKWAY
0.8
MARION REFINING
NORTH
MIDDLE
KERR-McGEE
FORK
DEER
ISLAND
DAUPHIN
0.4
DEER RIVER POINT
0.8
0.6
FORK DEER RIVER
AIRCO
PLANT SITE
DEER RIVER
RANGELINE ROAD
1.0
0.2
DEGUSSA
CREEK
RIVER
DEER
0.6
FORK
SOUTH
1.0
0.8
PARKWAY
ISLAND
DAUPHIN
MOBILE BAY
1.2
0.8
LAURENDINE ROAD
0 0.5 1
SCALE IN KILOMETERS
MUDDY
* POINT OF PREDICTED MAXIMUM INCREMENTAL CONTRIBUTION (1.2 ug/m³)
BELLEFONTAINE
N

Figure C.3

ISOPLETHS OF THE INCREMENTAL CONTRIBUTIONS TO PREDICTED ANNUAL AVERAGE GROUND-LEVEL SULFUR DIOXIDE CONCENTRATIONS (ug/m^3), PROPOSED CEMENT PLANT ONLY, THEODORE, ALABAMA, 1980

SOURCE: Environmental Science and Engineering, Inc., 1977.

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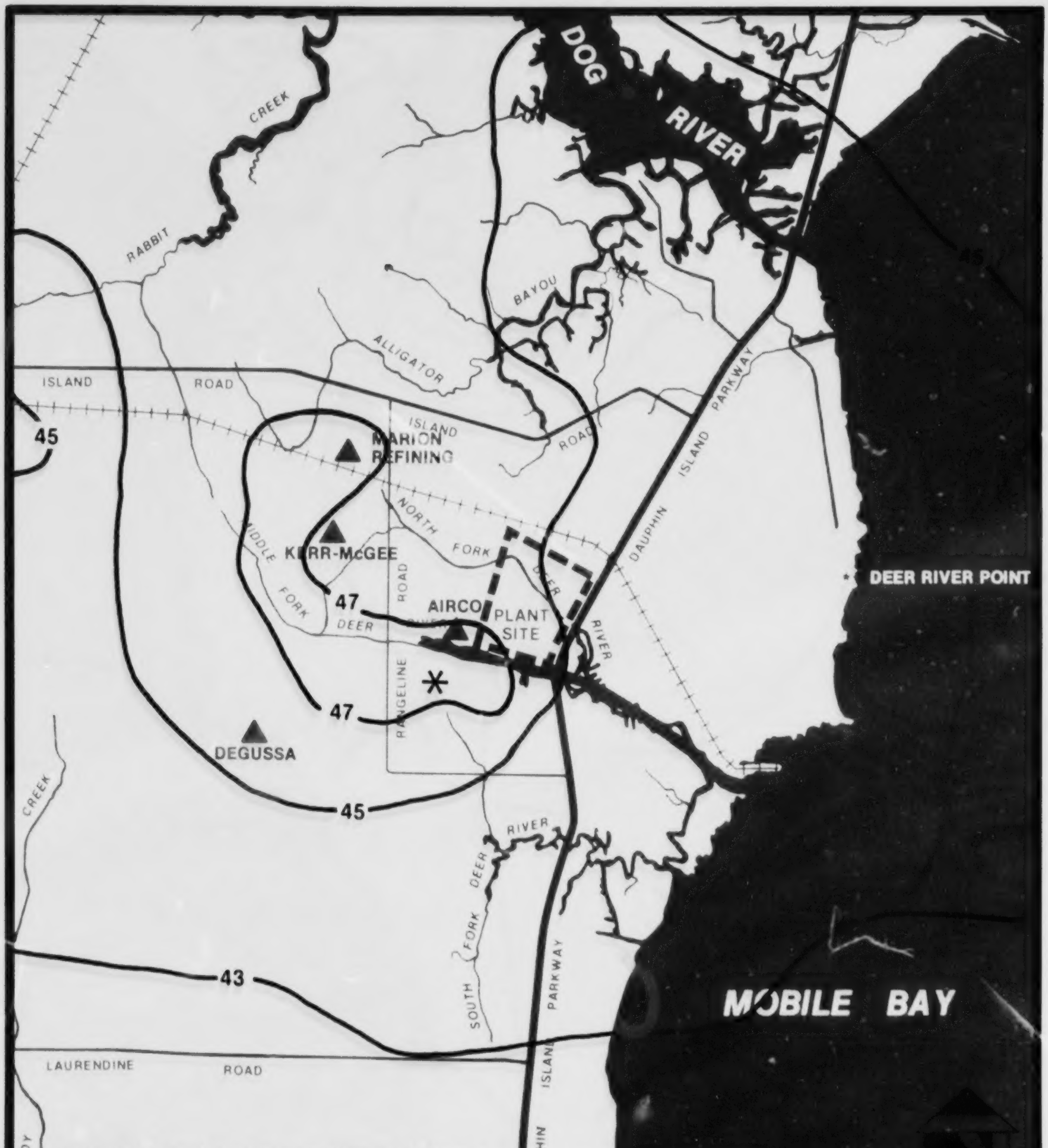
PLANT THEODORE INDUSTRIAL PARK
MOBILE, ALABAMA


DOG RIVER
RABBIT CREEK
BAYOU
ALLIGATOR
ISLAND ROAD
45
MARION REFINING
ISLAND ROAD
KERR-McGEE
NORTH FORK
MIDDLE FORK DEER
47
AIRCO
PLANT SITE
DEER RIVER
RANGELINE ROAD
DAUPHIN ISLAND PARKWAY
47
DEGUSSA
45
CREEK
RIVER
SOUTH FORK DEER
43
LAURENDINE ROAD
MUDDY
DEER RIVER POINT
MOBILE BAY
BELLEFONTAINE
N

* POINT OF MAXIMUM CONCENTRATION (48 ug/m³)

NOTE: CONCENTRATIONS INCLUDE A 35 ug/m³ BACKGROUND LEVE

Figure C.4
ISOPLETHS OF PREDICTED ANNUAL AVERAGE GROUND-LEVEL SUSPENDED PARTICULATE MATTER CONCENTRATIONS (ug/m3), WITHOUT THE PROPOSED CEMENT PLANT IN OPERATION, THEODORE, ALABAMA, 1980
SOURCE: Environmental Science and Engineering, Inc., 1977.

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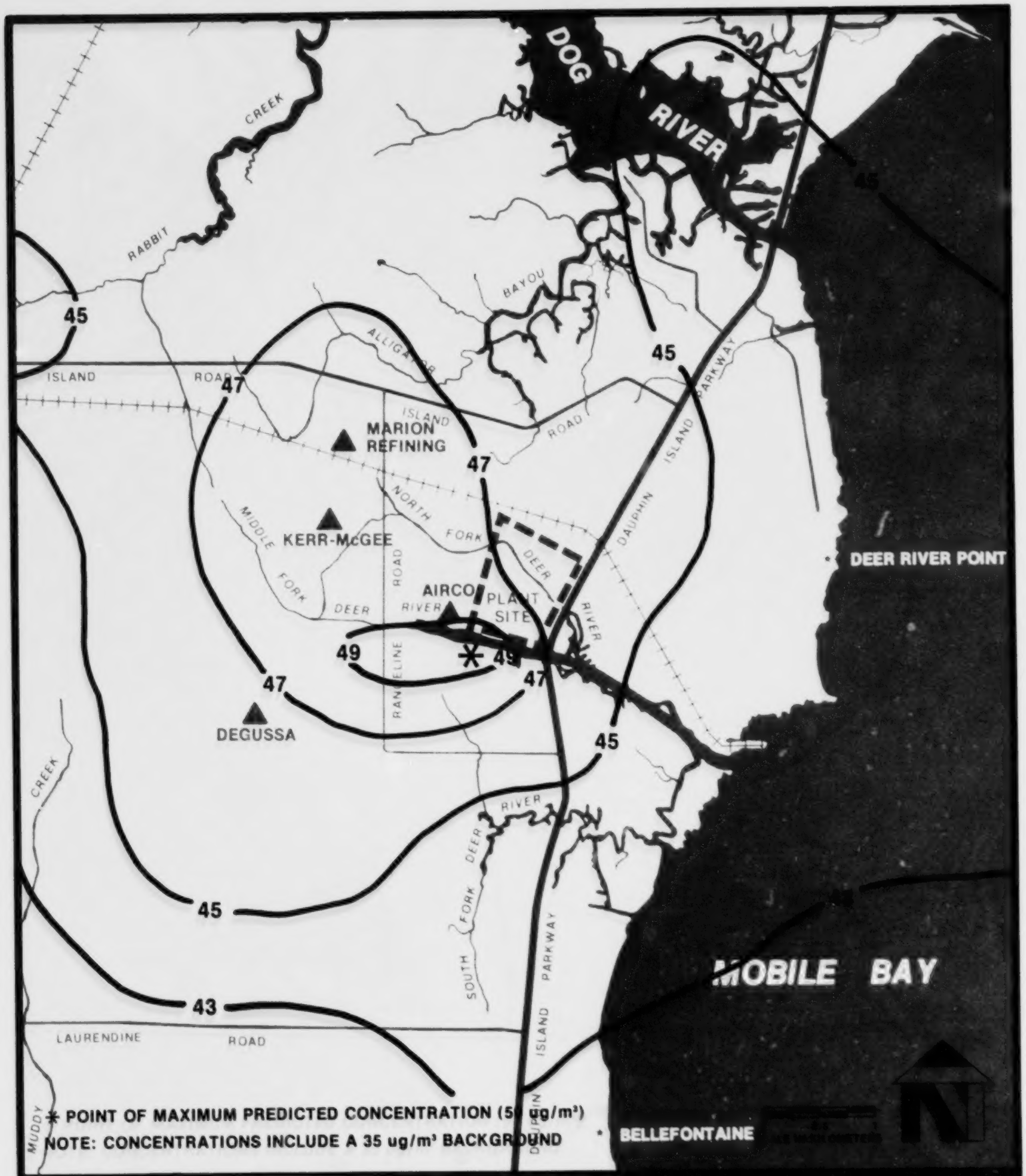
MOBILE, ALABAMA


DOG RIVER
CREEK
RABBIT
45
ISLAND ROAD
ALLIGATOR
BAYOU
47
MARION REFINING
KERR-McGEE
MIDDLE FORK DEER RIVER
NORTH FORK DEER RIVER
RANGELINE ROAD
AIRCO
PLANT SITE
49
47
DEGUSSA
45
DAUPHIN ISLAND PARKWAY
DEER RIVER POINT
CREEK
DEER RIVER
SOUTH FORK DEER
45
43
LAURENDINE ROAD
MUDDY
MOBILE BAY
BELLEFONTAINE
N

✱ POINT OF MAXIMUM PREDICTED CONCENTRATION (5[illegible] ug/m³)

NOTE: CONCENTRATIONS INCLUDE A 35 ug/m³ BACKGROUND

Figure C.5
ISOPLETHS OF PREDICTED ANNUAL AVERAGE GROUND-LEVEL SUSPENDED PARTICULATE MATTER CONCENTRATIONS (ug/m3), WITH THE PROPOSED CEMENT PLANT IN OPERATION, THEODORE, ALABAMA, 1980
SOURCE: Environmental Science and Engineering, Inc., 1977.

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MOBILE, ALABAMA

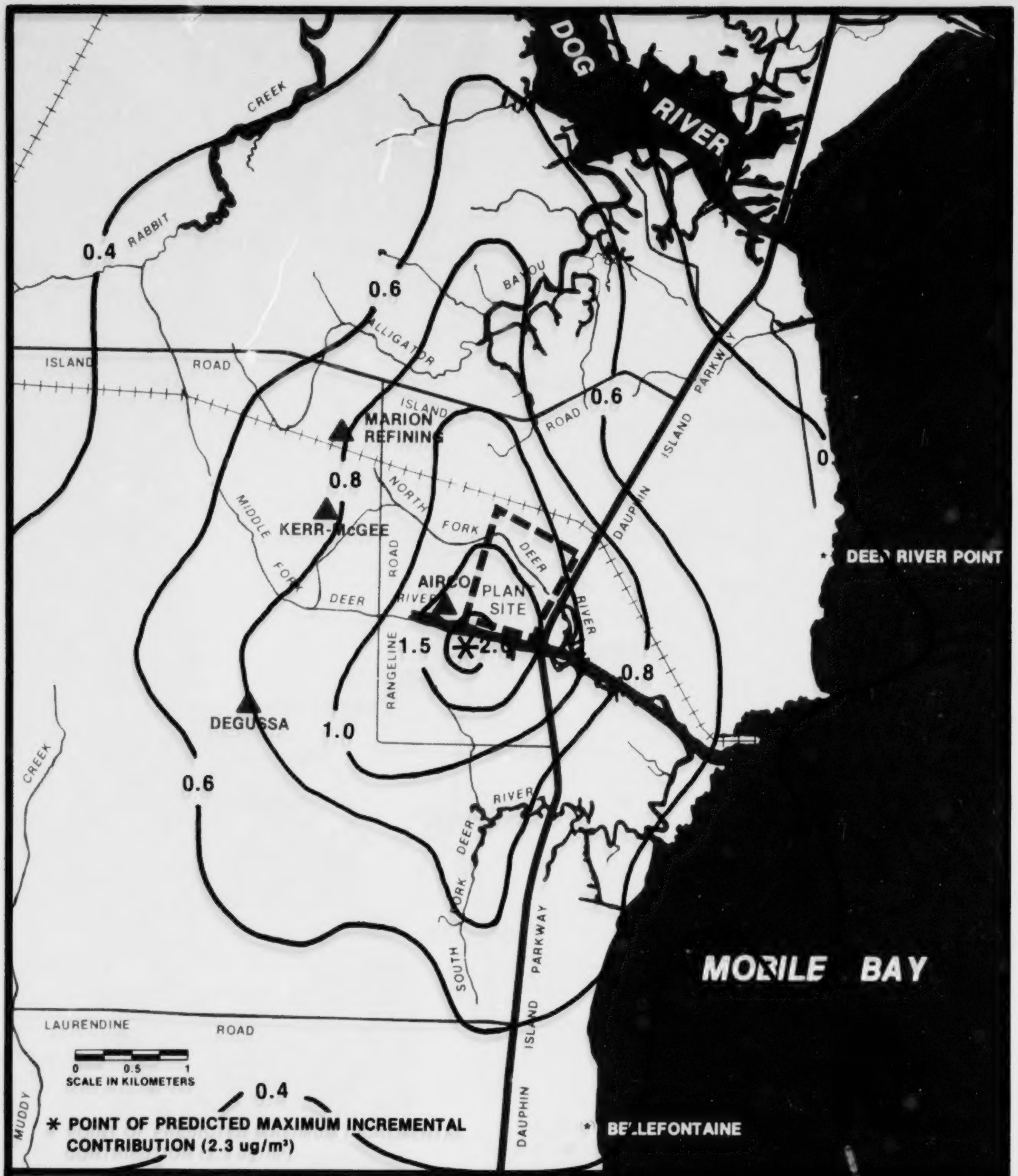
DOG RIVER
CREEK
RABBIT
0.4
0.6
BAYOU
ALLIGATOR
ISLAND
ROAD
ISLAND
ROAD
0.6
MARION REFINING
0.8
NORTH
FORK
MIDDLE
FORK
DEER
KERR-McGEE
DEER
ROAD
AIRCO
RIVER
PLANT SITE
RIVER
DAUPHIN ISLAND PARKWAY
DEER RIVER POINT
1.5
2.0
RANGELINE
0.8
DEGUSSA
1.0
0.6
CREEK
RIVER
DEER
FORK
SOUTH
PARKWAY
ISLAND
DAUPHIN
MOBILE BAY
LAURENDINE
ROAD
0
0.5
1
SCALE IN KILOMETERS
0.4
MUDDY
BELLEFONTAINE
* POINT OF PREDICTED MAXIMUM INCREMENTAL CONTRIBUTION (2.3 ug/m³)

Figure C.6
ISOPLETHS OF THE INCREMENTAL CONTRIBUTIONS TO PREDICTED ANNUAL AVERAGE GROUND-LEVEL SUSPENDED PARTICULATE MATTER CONCENTRATIONS (ug/m^3), PROPOSED CEMENT PLANT, THEODORE, ALABAMA, 1980
SOURCE: Environmental Science and Engineering, Inc., 1977.

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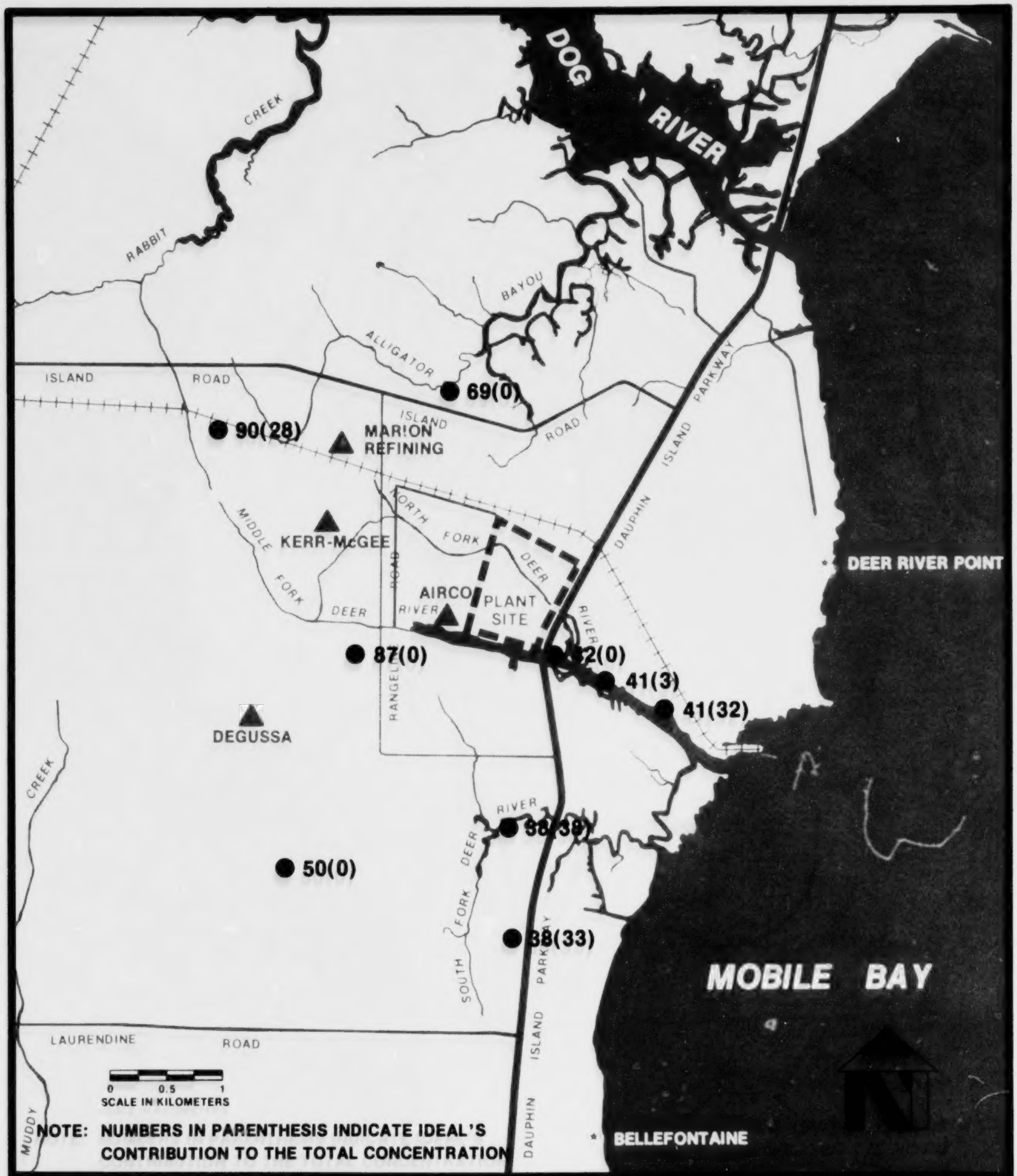
MOBILE, ALABAMA


DOG RIVER
CREEK
RABBIT
BAYOU
ALLIGATOR
ISLAND ROAD
69(0)
ISLAND ROAD
90(28)
MARION REFINING
KERR-McGEE
MIDDLE FORK DEER RIVER
NORTH FORK DEER RIVER
RANGEL ROAD
AIRCO
PLANT SITE
DAUPHIN ISLAND PARKWAY
DEER RIVER POINT
87(0)
2(0)
41(3)
41(32)
DEGUSSA
CREEK
RIVER
38(38)
SOUTH FORK DEER
50(0)
38(33)
MOBILE BAY
LAURENDINE ROAD
0 0.5 1
SCALE IN KILOMETERS
N
MUDDY
BELLEFONTAINE

NOTE: NUMBERS IN PARENTHESIS INDICATE IDEAL'S CONTRIBUTION TO THE TOTAL CONCENTRATION

Figure C.7
PREDICTED HIGHEST, SECOND HIGHEST 24-HOUR SULFUR DIOXIDE CONCENTRATIONS (ug/m^3), AT THE CRITICAL LOCATIONS, ALL SOURCES AT ALLOWABLE EMISSION RATES, THEODORE, ALABAMA, 1980

SOURCE: Environmental Science and Engineering, Inc., 1977.

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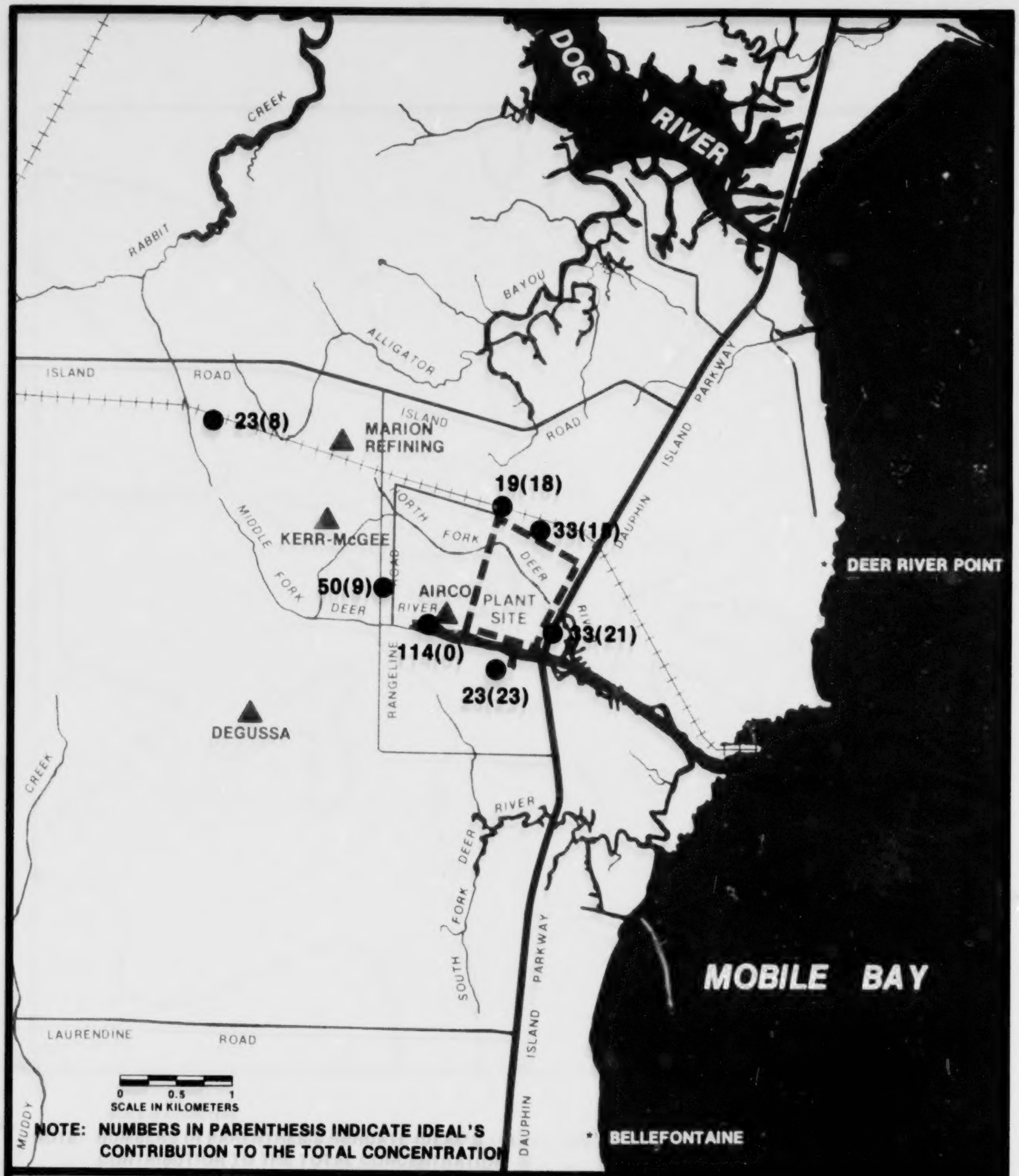
PROPOSED CEMENT MANUFACTURING PLANT THEODORE INDUSTRIAL PARK MOBILE, ALABAMA


DOG RIVER
CREEK
RABBIT
BAYOU
ALLIGATOR
ISLAND ROAD
ISLAND ROAD
23(8)
MARION REFINING
KERR-McGEE
MIDDLE FORK DEER RIVER
NORTH FORK DEER RIVER
19(18)
33(1
DAUPHIN ISLAND PARKWAY
DEER RIVER POINT
50(9)
AIRCO
PLANT SITE
33(21)
114(0)
23(23)
RANGELINE ROAD
DEGUSSA
CREEK
RIVER
SOUTH FORK DEER
DAUPHIN ISLAND PARKWAY
MOBILE BAY
LAURENDINE ROAD
0 0.5 1
SCALE IN KILOMETERS
MUDDY
BELLEFONTAINE

NOTE: NUMBERS IN PARENTHESIS INDICATE IDEAL'S CONTRIBUTION TO THE TOTAL CONCENTRATION

Figure C.8
PREDICTED HIGHEST, SECOND HIGHEST 24-HOUR SUSPENDED PARTICULATE MATTER CONCENTRATIONS (ug/m^3), AT THE CRITICAL LOCATIONS, ALL SOURCES AT ALLOWABLE EMISSION RATES, THEODORE, ALABAMA, 1980
SOURCE: Environmental Science and Engineering, Inc., 1977.

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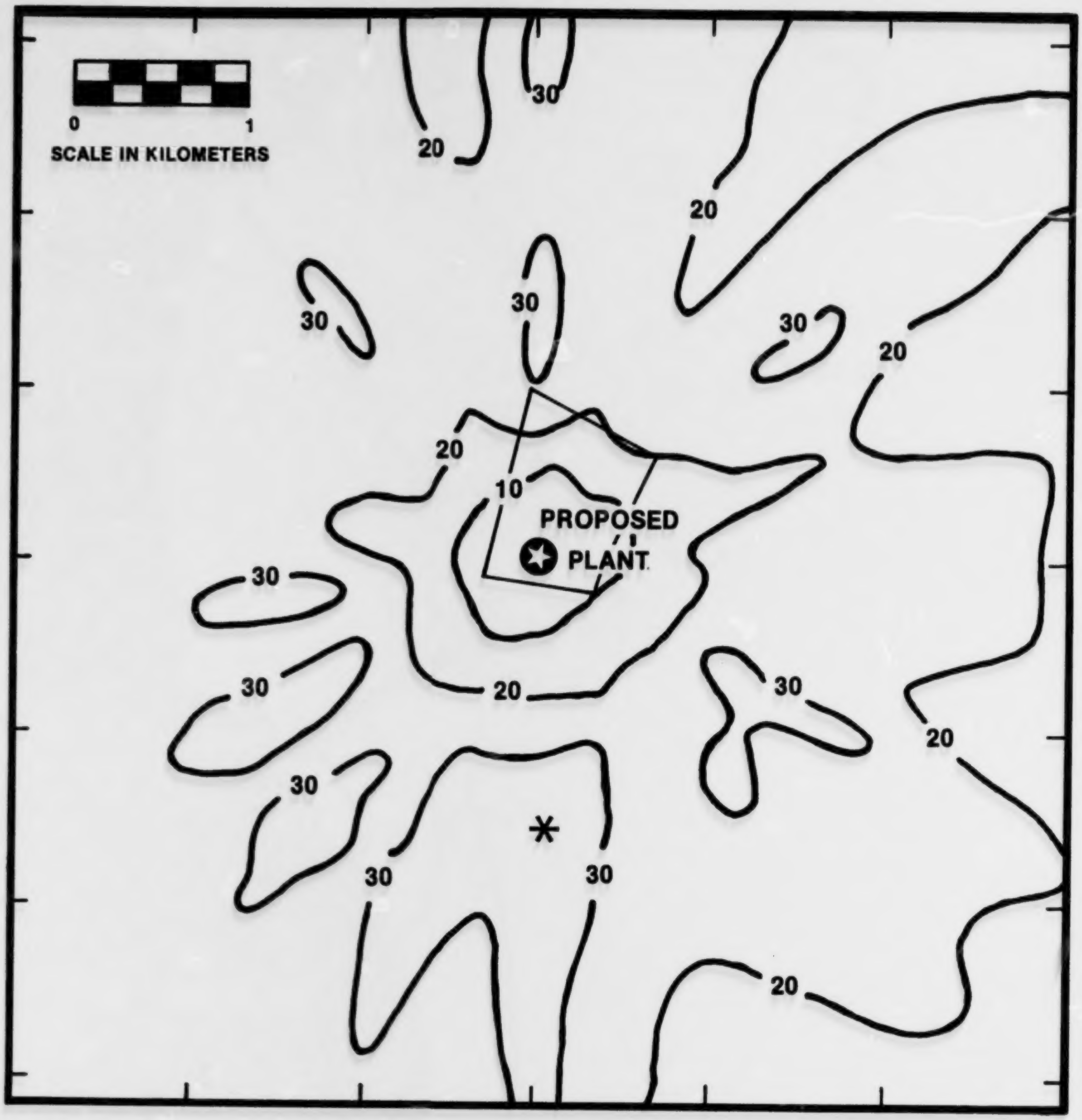
MOBILE, ALABAMA


0
1
SCALE IN KILOMETERS
30
20
20
30
30
30
20
20
10
PROPOSED
PLANT
30
30
20
30
30
20
30
30
20

* POINT OF MAXIMUM HIGHEST, SECOND HIGHEST CONCENTRATION (38 ug/m³)

Figure C.9
ISOPLETHS OF PREDICTED ANNUAL INCREMENTAL HIGHEST, SECOND HIGHEST 24-HOUR GROUND-LEVEL SULFUR DIOXIDE CONCENTRATIONS (ug/m^3), FOR THE IDEAL BASIC INDUSTRIES PROPOSED CEMENT PLANT ONLY, THEODORE, ALABAMA

SOURCE: Environmental Science and Engineering, Inc., 1977.

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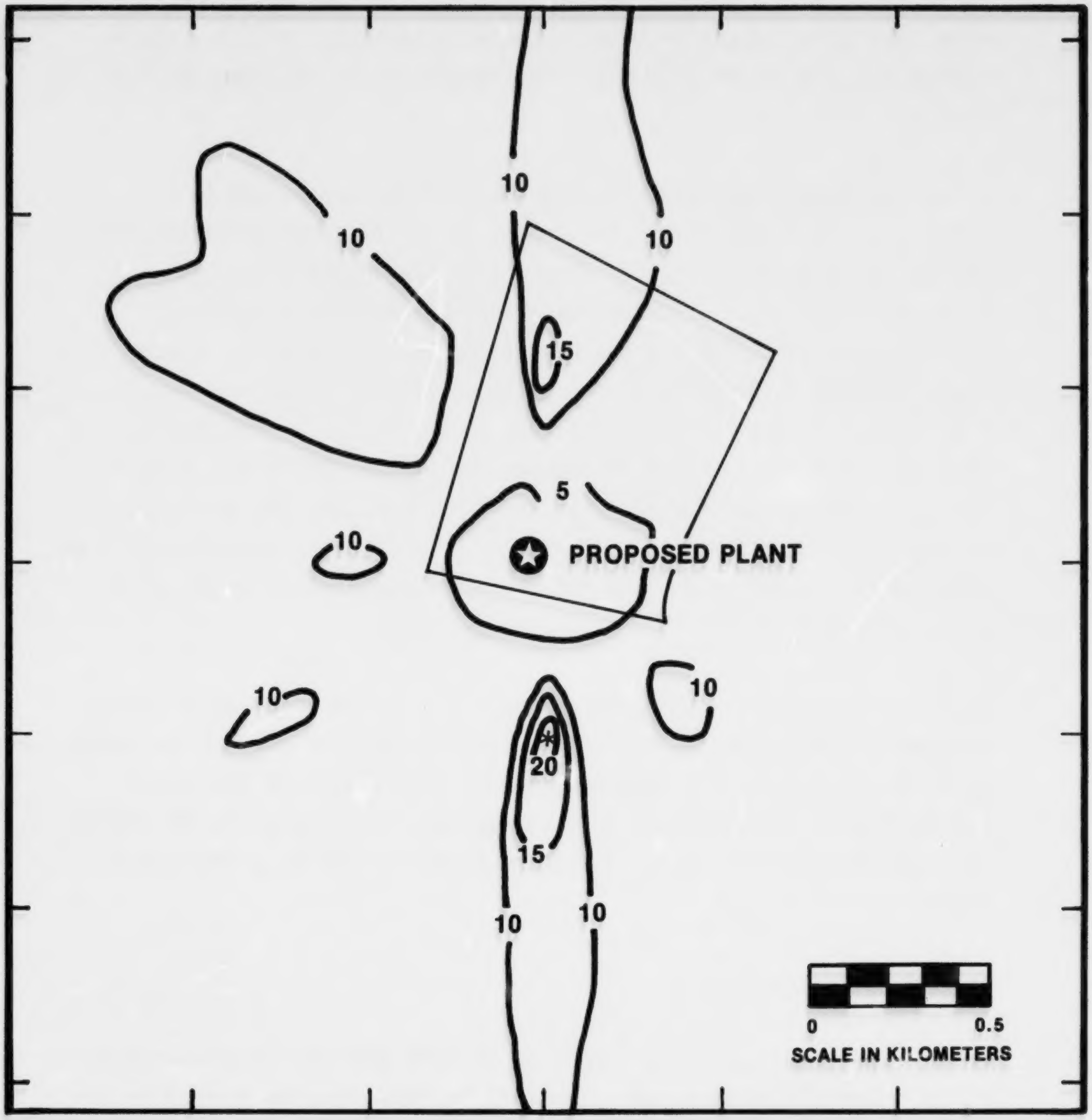
PLANT THEODORE INDUSTRIAL PARK
MOBILE, ALABAMA


10
10
10
15
5
PROPOSED PLANT
10
10
10
20
15
10
10
0
0.5
SCALE IN KILOMETERS

* POINT OF MAXIMUM HIGHEST, SECOND HIGHEST CONCENTRATION (23 ug/m³)

Figure C.10
ISOPLETHS OF PREDICTED ANNUAL INCREMENTAL HIGHEST, SECOND HIGHEST 24-HOUR GROUND-LEVEL SUSPENDED PARTICULATE MATTER CONCENTRATIONS (ug/m^3), FOR THE IDEAL BASIC INDUSTRIES PROPOSED CEMENT PLANT ONLY, THEODORE, ALABAMA
SOURCE: Environmental Science and Engineering, Inc., 1977.

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The highest, second highest 3-hour sulfur dioxide concentrations are not shown, but were calculated based on a ratio technique relative to 24-hour concentrations from each significant source for each receptor location.

All of these expected ambient concentrations are summarized in Table C.1. This table presents three types of receptor concentrations: maximum concentrations in 1980 from all sources operating; concentrations in 1980 from all sources operating that represent maximum degradation since 1974; and concentrations in 1980 from all sources operating that reflect the proposed cement plant's maximum contributions. The air quality concentrations shown have been estimated by mathematical modeling based on the meteorological conditions known to have occurred in 1974 for all baseline concentrations and from 1971 through 1975 for all other concentrations (1980). The geographical area affected by the emissions from the proposed cement plant is the area under consideration in Figures C.1 through C.10.

The specific receptor locations can be different for each of the five standards represented by the vertical columns and for each of the three emission situations. In addition, the concentrations of the annual geometric mean for suspended particulate matter are actually the annual averages depicted in Figures C.4 and C.6, multiplied by a conversion factor of 0.92.

Maximum Concentrations

Each of the values projected to occur in 1980 with the proposed project in operation (first emission situation) is less than the respective air quality standard, shown at the bottom of the table. This indicates that the standards will not be exceeded at any location affected by the proposed plant. As shown in the last column, the 24-hour suspended particulate standard will nearly be exceeded. However, this condition exists only in a very localized area near a present emission source (unrelated to the Ideal project) and will not be affected by the emissions from the cement plant under the meteorological conditions represented. All other meteorological conditions will produce lower concentrations than shown.

The third emission situation shows the concentrations that are directly related to the proposed cement plant during conditions of maximum ambient concentrations. The only significant contributions of the emissions from the cement plant are projected during the 24-hour and 3-hour criteria for sulfur dioxide. No reduction of sulfur dioxide was accounted for in the modeling; actual levels are expected to be substantially lower (up to 75 percent).

Therefore, the impact from this contribution to the projected maximum ambient air quality concentrations for sulfur dioxide and suspended particulate matter is considered of low magnitude. The significance is also rated low based on the small area affected by the plant's emissions. Like all other air quality impacts during operations, they will be long-term, but reversible.

Maximum Degradation

The central portion of Table C.1 deals with the locations of maximum air quality degradation, or the change between 1974 and 1980. The first row shows the concentrations estimated during baseline conditions at the points of maximum degradation. Next, the projected 1980 contribution from all sources is presented. (The concentrations and receptor locations for all the sulfur dioxide criteria are the same as those during maximum ambient concentrations mentioned previously.) The total changes in these air quality measures, presented in the row labeled "Degradation," are the quantities covered by PSD regulations. In none of these cases are the allowable federal increments exceeded. In addition, the portion of the increment remaining and its percentage of the total are given in the next two rows. These values represent the remaining portion of the increment after all projected emission sources are modeled at that specific receptor location and under the one day in five years of meteorological conditions. At all other receptor sites and on all other days, it is assumed, based on the modeling methodology utilized, that the remaining increment will be larger.

As shown by the row labeled "Ideal Impact," the proposed project will utilize less than 5 percent of the allowable annual increments of sulfur dioxide and suspended particulate matter at these locations (first and fourth columns). The project will consume 31 percent and 28 percent of the two short-term sulfur dioxide increments and will utilize 57 percent of the 24-hour suspended particulate increment.

Maximum Impact of Ideal

This emission situation considers the degradation due to emissions from all sources at the points of the maximum impact (contribution) of the emissions from the cement plant. The plant's impact is given first, followed by its related usage of the allowable increment and the portion of the increment remaining after all existing sources are considered.

The greatest effects of the proposed Ideal plant on annual mean concentrations will be to utilize 12 percent of the annual particulate increment and 6 percent of the annual sulfur dioxide increment. The plant will utilize up to 62 percent of the 24-hour particulate increment, and up to 42 percent and 39 percent of the 24-hour and 3-hour sulfur dioxide increments, respectively. The points of maximum effect by Ideal are not the points of greatest overall air quality degradation since the available increments at these receptor locations during the specific meteorological conditions associated with these concentrations are all higher than those discussed above under "Maximum Degradation."

The extent to which the proposed cement plant might limit allowable emissions by other new sources (also subject to PSD review), and thereby might influence future industrial growth could be a serious community impact, since much of the land near the Ideal Basic Industries plant site is intended for industrial development. The detailed air quality forecasts indicate that the proposed project will not place significant limitations upon future growth.

The growth limitation issue relates primarily to short-term air quality increments, since the proposed project does not place significant stress upon annual increments or annual ambient air quality standards. An important characteristic of short-term air quality measures is that the maximum values tend to involve highly specific combinations of emission sources, geographic areas, and meteorological conditions. As an example, the point of maximum consumption of the 24-hour sulfur dioxide increment (88 percent total consumption, 31 percent due to Ideal) is a location northwest of the proposed plant site near Island Road. A high consumption of the 24-hour particulate increment (54 percent total consumption, 22 percent due to Ideal) also occurs near this point. The reason is that this location is aligned with two existing emission sources as well as Ideal, so that winds from the southeast can cause the location to be impacted by all three sources. However, there are few sites where an industry could locate an additional emission source that would contribute to this impact. The only possibilities would be emission sources very close to the south bank of the ship channel, or perhaps additional sources on the existing industrial sites. Even if a plant were so located, there is sufficient increment remaining to accommodate many types of industrial plants.

This characteristic applies to the areas in which the Ideal Basic Industries project would consume significant shares of the short-term air increments. The critical areas for the 24-hour particulate increment (where total utilization by all sources in 1980 will exceed 50 percent) are situated close to the plant site, except for the location discussed above. In the case of the 24-hour sulfur dioxide increment, all of the high-utilization areas other than the location discussed earlier will be affected only slightly by the proposed cement plant.

The impacts of the proposed cement plant in utilizing these estimated portions of the PSD increments are of a moderate magnitude. However, in consideration of the area affected, the available increment remaining, the conservative modeling methodology used, and the over-estimation of the plant's sulfur dioxide emissions (no reduction assumed), the significance is considered low. This impact is long-term and reversible.

Nitrogen Oxides

Nitrogen oxide emissions from the proposed cement plant were modeled on a long-term basis by use of the Air Quality Display Model (see PSD Modeling Report for a description of this model). This model estimates annual average concentrations of non-reactive pollutants. The dispersion model results, therefore, reflect complete and immediate conversion of all nitrogen oxide to nitrogen dioxide. In reality, during the photolytic cycle which involves nitrogen oxide, nitrogen dioxide, hydrocarbons, photochemical oxidants, and sunlight, the nitrogen oxide is not converted immediately to nitrogen dioxide, but is converted at a rate which is dependent on the concentrations of other participant pollutants and meteorological factors (U.S. EPA, Air Pollution Control Office, 1971). Thus, the dispersion model tends to overestimate ambient concentrations of nitrogen dioxide.

To assess the air quality impact associated with nitrogen oxide emissions, only the proposed cement plant was modeled. Any attempt to model other sources of nitrogen oxides in Mobile County for their contributions to levels at the proposed plant site would yield highly unreliable results.

Figure C.11 shows isopleths of estimated annual average ground-level concentrations of nitrogen dioxide due to operation of the proposed cement plant. The location of the point of maximum impact is indicated by a star in the figure, and the annual average concentration at this point is 0.7 ug/m^3. These estimates are very conservative in nature, and actual ambient concentration could be much lower. This maximum concentration is well below the National Ambient Air Quality Standard of 100 ug/m^3 annual average basis; therefore, this estimated concentration is considered a long-term, but reversible impact of low magnitude and low significance.

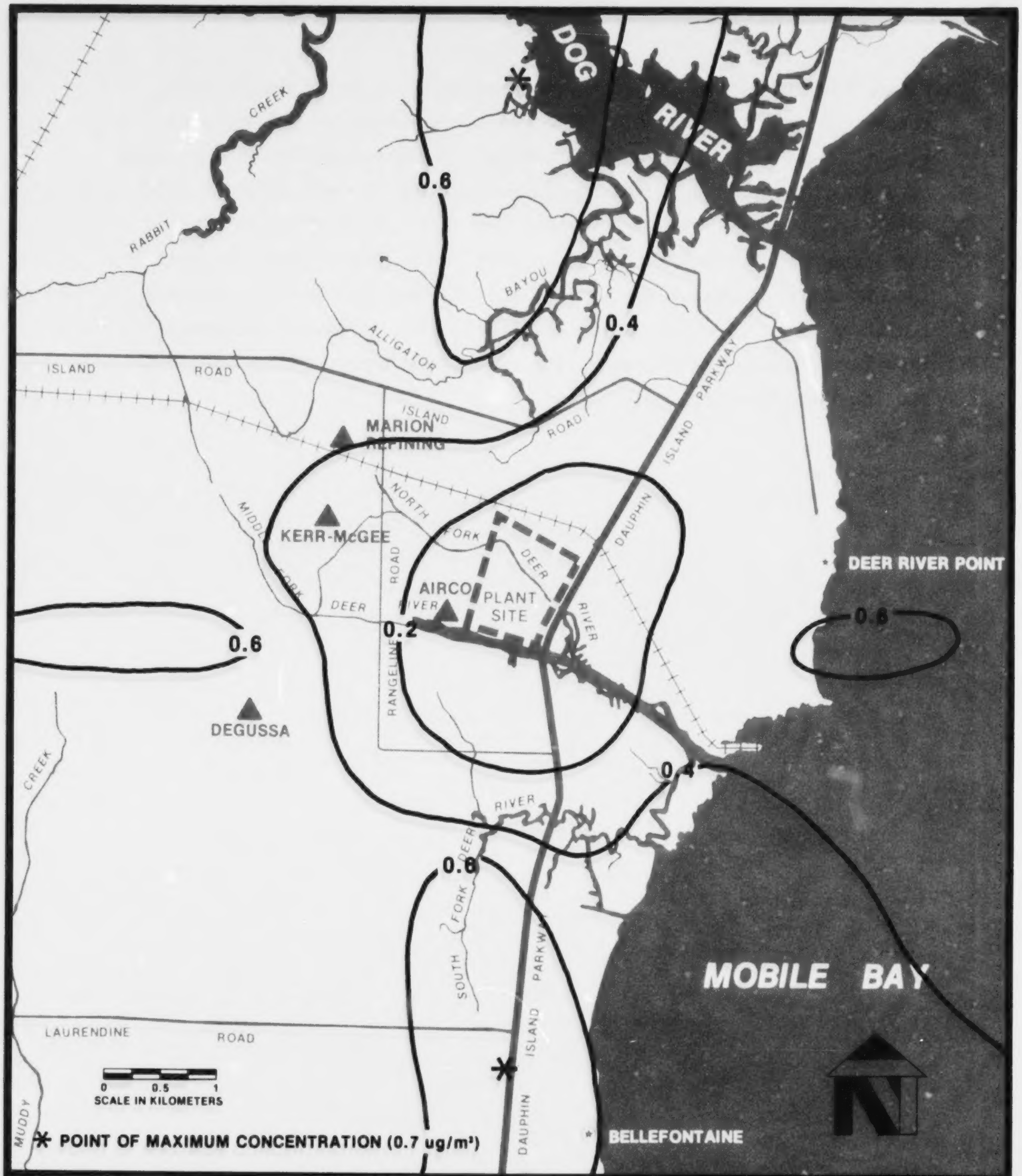
DOG RIVER
0.6
RABBIT CREEK
BAYOU
ALLIGATOR
0.4
ISLAND ROAD
ISLAND ROAD
MARION REFINING
KERR-McGEE
MIDDLE FORK
NORTH FORK DEER
DEER RIVER
AIRCO
PLANT SITE
0.2
RANGELINE ROAD
DAUPHIN ISLAND PARKWAY
DEER RIVER POINT
0.6
0.6
DEGUSSA
CREEK
0.4
RIVER
DEER RIVER
0.6
SOUTH FORK DEER
MOBILE BAY
LAURENDINE ROAD
0 0.5 1
SCALE IN KILOMETERS
MUDDY
✱ POINT OF MAXIMUM CONCENTRATION (0.7 ug/m³)
BELLEFONTAINE
N

Figure C.11
ISOPLETHS OF THE INCREMENTAL CONTRIBUTIONS TO ANNUAL AVERAGE GROUND-LEVEL NITROGEN DIOXIDE CONCENTRATIONS (ug/m^3), DUE TO OPERATION OF THE PROPOSED CEMENT PLANT ONLY, THEODORE, ALABAMA

SOURCE: Environmental Science and Engineering, Inc., 1977.

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NOISE

CONSTRUCTION IMPACTS

Construction of the Theodore Ship Channel and the Ideal Basic Industries cement plant will occur during the same time period and therefore the effect of the channel construction project has been assessed to obtain the combined impact of both projects, as well as to distinguish the impact of the cement plant. The channel construction project can be performed by using a 0.7-meter (27-inch) hydraulic dredge and an assisting tug.

Ship Channel Construction: Noise Analysis

The major noise sources during the improvement and extension of the Theodore Ship Channel will be the dredge, attendant boat, and the dredge pump. For this noise analysis, the following assumptions were made:

1. The dredge, pump, and boat will work the inland area along the barge canal.
2. The dredge will move along a straight line at the rate of 305 meters (1,000 feet) per month and will operate 24 hours per day.
3. As a "worst case," the path followed by the dredge will be 30 meters (100 feet) from each noise monitoring station.
4. The critical time for both projects will be a three-month construction period, during which the dredge will cover the area from a point 152 meters (500 feet) to the east of the Ideal Basic Industries property to the boundary between Ideal Basic Industries and Airco, Inc., while the cement plant's heavy equipment usage will be at a maximum level.
5. The dredge, pump, and boat combination will produce a sound power level of 85 dBA at 30 meters (100 feet).

The following results were obtained from the noise analysis of the ship channel project:

1. An average three-month $L_{eq}(24)$ of 75 dBA will be observed at each station along the barge canal.
2. An average three-month L_{dn} of 81 dBA will be observed at each station along the barge canal.

Cement Plant Construction: Noise Analysis

Noise from the construction of the proposed cement plant will originate from heavy equipment used in the clearing, excavation, foundation work, and framing phases of construction.

Equipment associated with earthmoving, lifting, welding, paving, pile-driving, and transportation will be the primary sources of construction noise. Table C.2 lists the types and numbers of pieces of equipment originally projected to be used at the site during the highest level of construction activity and gives the noise characteristics of the equipment. The analysis has assumed that there will be 1,750 one-way vehicular trips to and from the plant site daily during the peak construction period.

Construction activities are expected to last for two and one-half years. Maximum construction-related activities will occur after approximately one year of work. At that time approximately 120 pieces of heavy equipment will be in use.

For this study, it was assumed that at any given time throughout an eight-hour day, 75 percent of the equipment will be in operation. Furthermore, it was assumed that the characteristics listed in Table C.2 are applicable since the noise levels listed have been mandatory for all government contractors since 1973.

Since the spatial arrangement of construction equipment is impossible to specify, some simplifying assumptions were made. It was assumed that within the plant site the distribution of all pieces of equipment would

Table C.2. Types, Numbers, and Noise Characteristics of Heavy Pieces of Equipment Required During Busiest Phase of Construction

Equipment	Number[a]	Noise Level in dBA at 15 meters[b]
Earthmoving		
Dozers	3	80
Scrapers	2	88
Graders	2	85
Loaders	3	79
Rollers	1	89
Carry-alls	3	--
Lifting		
Cranes	3	83
Forklifts	4	--
Welding		
Welders	10	--
Compressors	8	81
Generators	3	78
Paving and Concrete		
Backhoes	8	85
Mixers	4	85
Vibrators	10	76
Rollers	1	89
Concrete Finishers	5	--
Pile Drivers	3	101
Transporters		
Trucks	47	91

Sources: a. Brown & Root, Inc., 1977.

b. Schomer and Homans, 1975. These are the old (July 1, 1973) GSA standards for government contractors. They were superseded by lower noise level requirements on January 1, 1975. Values from the old standards were used in the models for conservative estimates of expected noise levels.

be random. It was also assumed that the 120 point sources could be simplified by nine large identical point sources. Each theoretical source has elements of the pavers, trucks, dozers, compressors, pile drivers, etc., and is evaluated at 99.5 dBA at a distance of 15 meters (50 feet).

The combined contributions of the nine theoretical noise sources to environmental noise levels are displayed in Figure C.12. The shape of the contours is due to the existence of more forested areas in certain directions. Accordingly, corrections of 5 dBA per 30 meters (100 feet) and 2 dBA per 30 meters (100 feet) were made for thick and sparse plantings, respectively. A maximum of 10 dBA was used for the vegetation's attenuation of the sound levels. If no other noise sources existed in the area, the sphere of influence of construction noise would extend over 0.8 kilometers (one-half mile) south of the Ideal Basic Industries property, approximately 0.4 kilometers (one-fourth mile) north of the property, over 1.6 kilometers (one mile) west, and 0.8 kilometers (one-half mile) east of the property.

The noise values are given in terms of L_{dn}. The contours developed are exclusive of contributions from the existing ambient noise levels, construction-associated traffic, or improvement of the ship channel.

Predicted Noise Levels at Baseline Monitoring Stations

Since the ship channel will be extended whether or not Ideal Basic Industries builds the proposed facility, the noise levels attributed to the construction of the cement plant must be added to those caused by the construction of an improved channel. The effects of the proposed facility construction upon the original 12 monitoring stations in the vicinity of the proposed site (Figure C.13) are presented in Table C.3. The three "worst case" situations presented are:

1. The 3-month period of dredging in front of the plant site by the U.S. Army Corps of Engineers (without plant construction);

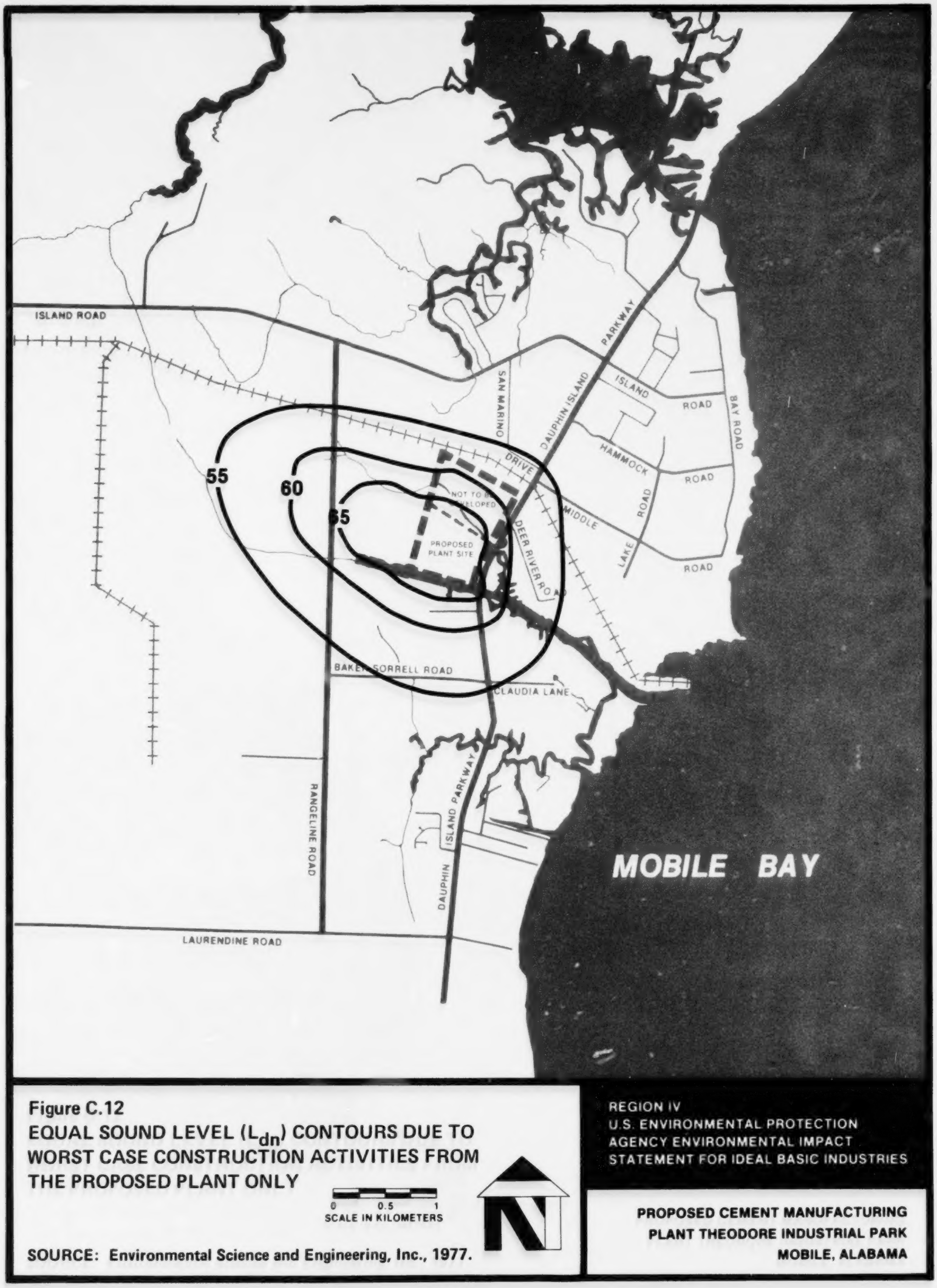
ISLAND ROAD
SAN MARINO DRIVE
DAUPHIN ISLAND PARKWAY
ISLAND ROAD
BAY ROAD
HAMMOCK ROAD
MIDDLE ROAD
LAKE ROAD
DEER RIVER ROAD
55
60
65
NOT TO BE DEVELOPED
PROPOSED PLANT SITE
BAKER SORRELL ROAD
CLAUDIA LANE
RANGELINE ROAD
DAUPHIN ISLAND PARKWAY
LAURENDINE ROAD
MOBILE BAY

Figure C.12

EQUAL SOUND LEVEL (L_{dn}) CONTOURS DUE TO WORST CASE CONSTRUCTION ACTIVITIES FROM THE PROPOSED PLANT ONLY

0 0.5 1
SCALE IN KILOMETERS

N

SOURCE: Environmental Science and Engineering, Inc., 1977.

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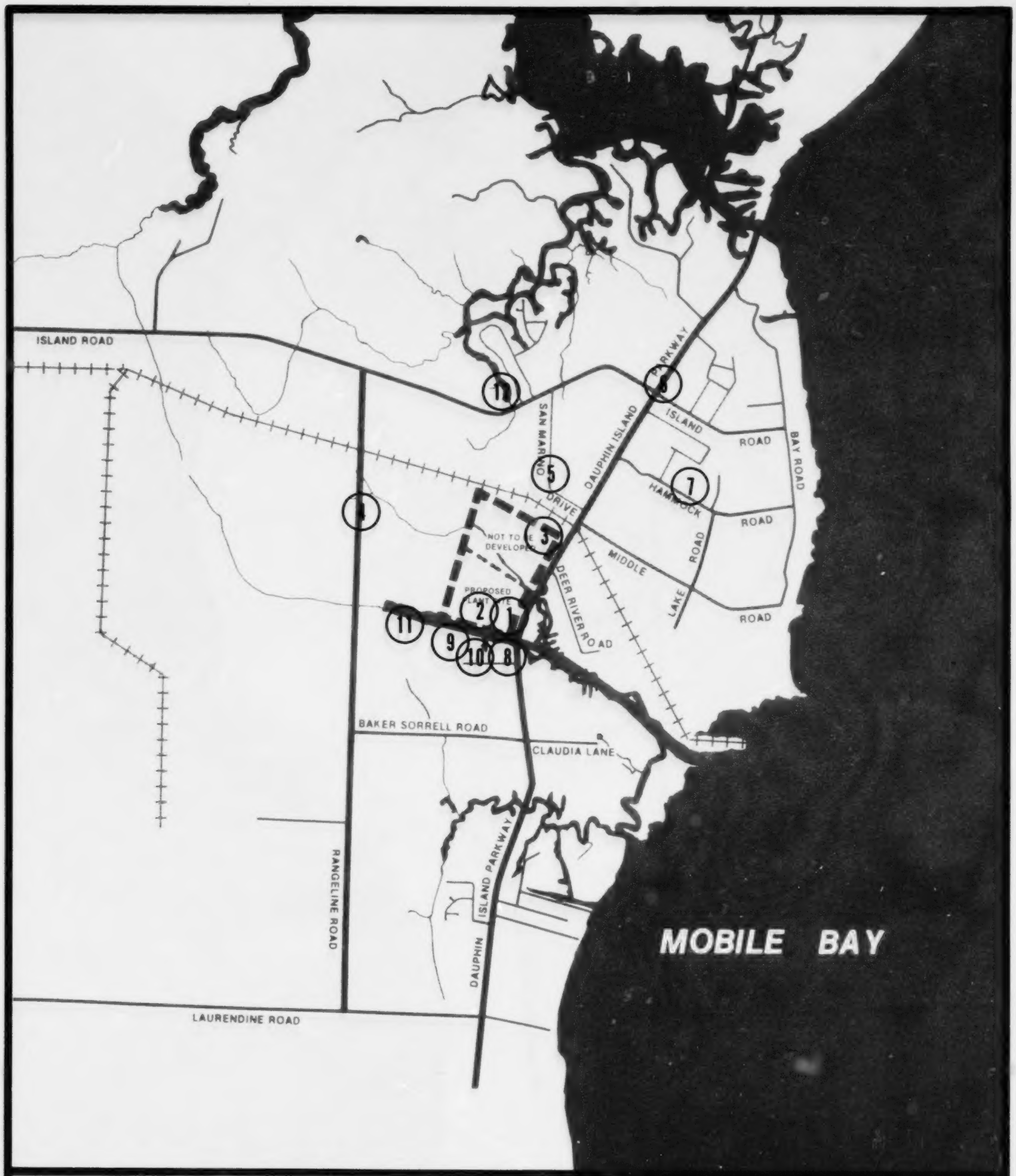
ISLAND ROAD
12
6
DAUPHIN ISLAND PARKWAY
ISLAND
ROAD
BAY ROAD
SAN MARINO
DRIVE
5
7
HAMMOCK
ROAD
4
3
NOT TO BE DEVELOPED
MIDDLE
LAKE
ROAD
DEER RIVER ROAD
PROPOSED PLANT SITE
2
1
11
9
10
8
BAKER SORRELL ROAD
CLAUDIA LANE
RANGELINE ROAD
DAUPHIN ISLAND PARKWAY
LAURENDINE ROAD
MOBILE BAY

Figure C.13
NOISE MONITORING STATIONS

0 0.5 1
SCALE IN KILOMETERS

N

SOURCE: Environmental Science and Engineering, Inc., 1977.

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Table C.3. Noise Levels (dBA) at the Baseline Monitoring Stations and Predicted Levels for Three "Worst Case" Situations

Station	Baseline		Baseline Plus Channel Construction		Baseline Plus Cement Plant Construction		Baseline Plus Channel and Cement Plant Construction	
	L_{dn}*	$L_{eq(24)}$*	L_{dn}	$L_{eq(24)}$	L_{dn}	$L_{eq(24)}$	L_{dn}	$L_{eq(24)}$
1	55	48/70	81 (26)	75 (27)	67 (12)	67 (19)	81 (26)	76 (28)
2	54	49/70	81 (27)	75 (26)	84 (30)	84 (35)	86 (32)	85 (36)
3	48	45/70	48 (0)	45 (0)	62 (14)	61 (16)	62 (14)	61 (16)
4	72	66/70	72 (0)	66 (0)	73 (1)	69 (3)	73 (1)	69 (3)
5	48/55	45	48 (0)	45 (0)	56 (8)	55 (10)	56 (8)	55 (10)
6	65	61/55	65 (0)	61 (0)	66 (1)	62 (1)	66 (1)	62 (1)
7	55	53/55	55 (0)	53 (0)	57 (2)	55 (2)	57 (2)	55 (2)
8	55/55	48	81 (26)	75 (27)	73 (18)	73 (25)	82 (27)	77 (29)
9	53/55	51	81 (28)	75 (24)	67 (14)	67 (16)	81 (28)	75 (24)
10	54/55	52	81 (27)	75 (23)	67 (13)	67 (15)	81 (27)	76 (24)
11	67	59/70	† (NA)	† (NA)	68 (1)	64 (5)	† (NA)	† (NA)
12	67/55	66	67 (0)	66 (0)	68 (1)	67 (1)	68 (1)	67 (1)

* Second numbers refer to the sound levels requisite to protect public health and welfare according to land use (see Table B.N.2).

† No estimate since site is in future turning basin.

NOTE: Numbers in parentheses are increases in equivalent sound levels over baseline conditions.

Source: Environmental Science and Engineering, 1977.

2. The 3-month period of maximum usage of heavy equipment for plant construction (with no Corps dredging); and
3. The simultaneous occurrence of both construction projects at their individual "worst case" levels.

Sound levels at 7 of the 12 stations will be significantly affected by the channel and/or plant construction. Of these stations, Nos. 1 and 2 will be unduly biased due to their on-site locations with respect to plant construction activities.

The important stations are those just north of the plant site (Nos. 3 and 5) and those along the southern bank of the barge canal (Nos. 8, 9, and 10). These stations represent levels at possible receptor locations in the nearby residential areas.

The ship channel project is estimated to affect only those stations along the channel, whereas the cement plant will affect these same stations (but to a lesser degree) and will also affect the stations just north of the plant site.

If these two worst case conditions coincide, the impact of the cement plant's construction is overshadowed by the ship channel dredging at stations 8, 9, and 10. Without assessing the noise generated from the ship channel project, the cement plant's construction will substantially raise the equivalent sound levels above baseline conditions at these three stations.

In either case, the plant's construction activities will raise appreciably noise levels at stations 3 and 5. However, since the two projects are part of the overall industrialization occurring in the vicinity of the proposed plant site, much of the area impacted by the Corps of Engineers and Ideal Basic Industries projects will be changing in land use designation from residential or vacant to industrial. For a more detailed description, refer to the discussions of the 1992 environment in Appendix B, Baseline, and in Appendix E, Alternatives.

In relation to the EPA noise levels identified as requisite to protect public health and welfare (see Table C.3), the noise levels from construction activities for the cement plant only are expected to have various effects. Within the zone of influence described by the area of 55 dBA (Ldn) or greater (see Figure C.12), the activities will increase the noise levels to greater than those suggested for normal outdoor speech communication at about 3 meters (10 feet). These levels should be somewhat similar to those found in metropolitan residential areas throughout the United States. The noise levels outside the plant property should be below the suggested Leq (24) of 70 dBA that could cause hearing loss over an extended time (40 years). Outside this zone of influence, the effect of the construction activities at the plant, although perceptible along the area bordering the 55 dBA contour, should not cause disturbance with outdoor communication or activity.

In summary, the primary impacts of the plant construction on the local noise levels are estimated to be of moderate magnitude due to the levels projected within the zone of influence, but of low significance due to the number of residences affected and the short duration (3 months) of the worst case analysis period. Construction during the remaining 27 months will generate noise, but to a lesser degree. Table C.4 shows the existing, 1980, and 1992 residential house counts for both the construction and operation noise impacts of the proposed project. It is estimated that during the construction period, between 60 and 75 residences may be affected by equivalent sound levels equal to or greater than 55 dBA generated from the construction activities.

The cement plant's construction impacts will be reversible and short-term. The secondary impacts are discussed in the Ecology and Socioeconomics sections.

Table C.4. Dwelling Counts within the Zone of Influence of the Noise Levels from Construction and Operation of the Proposed Plant

Phase	Existing Dwellings 1978	Dwellings Present and Occupied in 1980	Dwellings Present and Occupied in 1992
Construction Phase			
Inside 65 dBA Contour	7	0	--
Inside 60 dBA Contour*	22	10	--
Inside 55 dBA Contour*	75	60	--
Operations Phase			
Inside 65 dBA Contour	0	0	0
Inside 60 dBA Contour*	18	6	0
Inside 55 dBA Contour*	32	20	6

* The figures refer to the cumulative number of dwellings. For example, the figures for the 55 dBA contour include all dwellings inside the 60 dBA and 65 dBA contours.

Source: Environmental Science and Engineering, Inc., 1978.

OPERATION IMPACTS

Noise from the operation of the cement plant will originate from the specific equipment used during each step of the process, including raw material and finished product handling and rail, barge, and employee traffic. Table C.5 is a summary of the principal plant noise sources during plant operation.

Equipment Noise

The process equipment will be the primary source of continuous noise during plant operation. Table C.6 lists typical pieces of equipment found at cement plants and their associated noise characteristics. There are numerous other pieces of equipment which contribute to the total noise emanating from a cement plant.

Noise Analysis of a Typical Plant

Because of the complexities and uncertainties involved in determining contributions of each point source within the plant to environmental noise levels away from the plant, an alternative method of analysis was used. A noise survey was performed at a cement plant which utilizes the dry process and which has one-third the capacity of the proposed Ideal Basic Industries facility. Noise levels were recorded at various points within and around the plant in order to gain information on typical noise levels associated with operation of a cement plant.

The monitoring stations and the actual measurements taken at Cement Plant "A" are shown in Figure C.14. The data from this figure were recalculated and weighted towards nighttime effects and are shown in Figure C.15. Contours of equal noise levels are shown in Figure C.16.

The data acquired from Cement Plant "A" indicate that most noise emanates from the kiln and the raw grinding and finishing grinding processes and shows the effects of distance and barrier attenuation.

Table C.5. Sources of Noise During Plant Operation

Source	Intermittent During Operating Hours	Continuous During Operating Hours
Raw Materials Handling		X
Crushing Operation		X
Kilns		X
Finish Mills		X
Finish Product Handling		X
Employee Traffic	X	
Channel Traffic	X	
Haul Trucks	X	
Railroad	X	

Sources: Applied Science and Resource Planning, Inc., 1973.
Environmental Science and Engineering, Inc., 1977.

Table C.6. Average Values of Sound Levels Measured in Operating Cement Plants at Distances of 4.5 Meters (15 Feet)

Source	Sound Level (dBA)
Finish Grinding Mill	105
Raw Grinding Mill (Dry)	103
Raw Grinding Mill (Wet)	97
Rotary Compressor	97
Bucket Elevator (Head)	88

Source: Johnson, 1972.

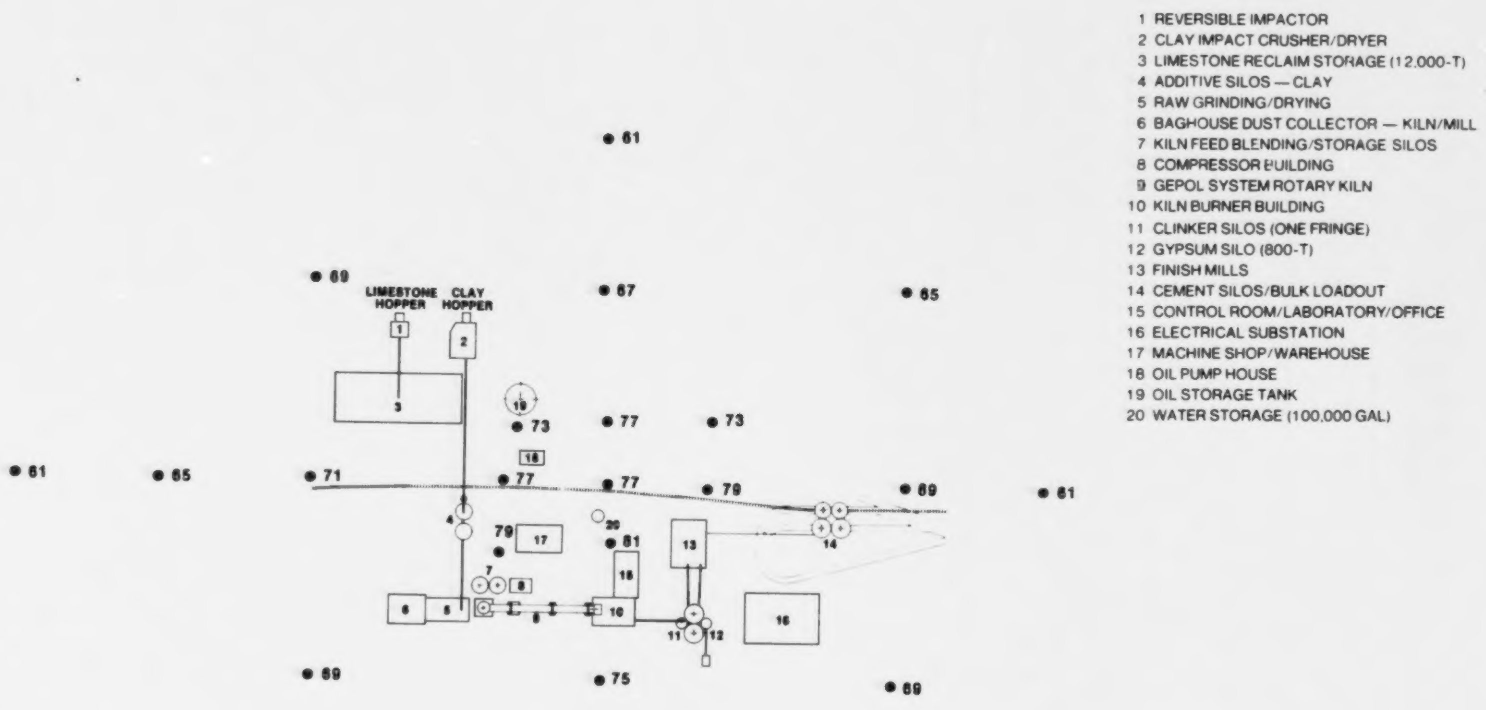
1 REVERSIBLE IMPACTOR
2 CLAY IMPACT CRUSHER/DRYER
3 LIMESTONE RECLAIM STORAGE (12,000-T)
4 ADDITIVE SILOS — CLAY
5 RAW GRINDING/DRYING
6 BAGHOUSE DUST COLLECTOR — KILN/MILL
7 KILN FEED BLENDING/STORAGE SILOS
8 COMPRESSOR BUILDING
9 GEPOL SYSTEM ROTARY KILN
10 KILN BURNER BUILDING
11 CLINKER SILOS (ONE FRINGE)
12 GYPSUM SILO (800-T)
13 FINISH MILLS
14 CEMENT SILOS/BULK LOADOUT
15 CONTROL ROOM/LABORATORY/OFFICE
16 ELECTRICAL SUBSTATION
17 MACHINE SHOP/WAREHOUSE
18 OIL PUMP HOUSE
19 OIL STORAGE TANK
20 WATER STORAGE (100,000 GAL)
LIMESTONE HOPPER
CLAY HOPPER
61
69
67
65
73
77
73
61
65
71
77
77
79
69
61
79
81
69
75
69
0
100
SCALE IN METERS

Figure C.14
SOUND LEVELS (L_{eq}) RECORDED AT CEMENT PLANT "A" (dBA)

SOURCE: Environmental Science and Engineering, Inc., 1977.

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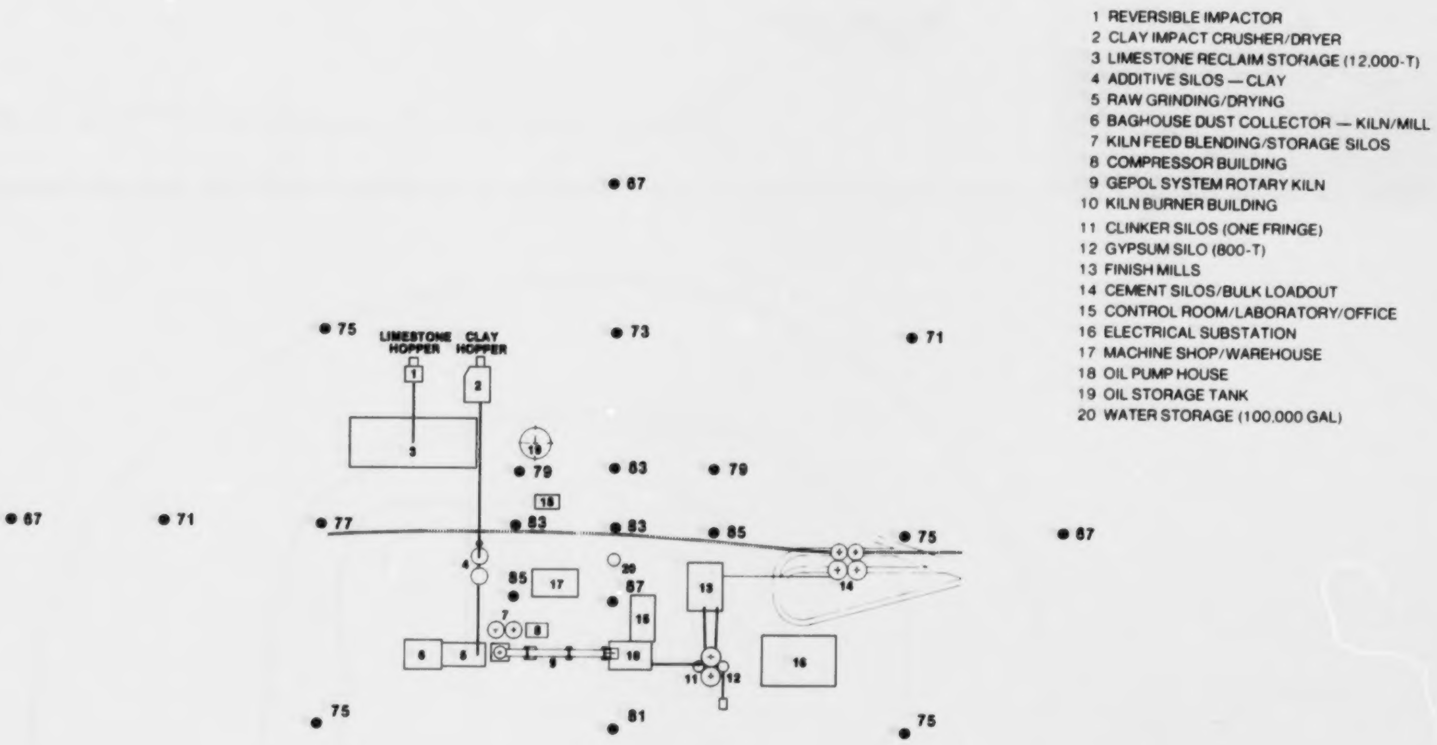
1 REVERSIBLE IMPACTOR
2 CLAY IMPACT CRUSHER/DRYER
3 LIMESTONE RECLAIM STORAGE (12,000-T)
4 ADDITIVE SILOS — CLAY
5 RAW GRINDING/DRYING
6 BAGHOUSE DUST COLLECTOR — KILN/MILL
7 KILN FEED BLENDING/STORAGE SILOS
8 COMPRESSOR BUILDING
9 GEPOL SYSTEM ROTARY KILN
10 KILN BURNER BUILDING
11 CLINKER SILOS (ONE FRINGE)
12 GYPSUM SILO (800-T)
13 FINISH MILLS
14 CEMENT SILOS/BULK LOADOUT
15 CONTROL ROOM/LABORATORY/OFFICE
16 ELECTRICAL SUBSTATION
17 MACHINE SHOP/WAREHOUSE
18 OIL PUMP HOUSE
19 OIL STORAGE TANK
20 WATER STORAGE (100,000 GAL)
LIMESTONE HOPPER
CLAY HOPPER
67
75
73
71
79
83
79
67
71
77
83
83
85
75
67
85
87
75
81
75
0
100
SCALE IN METERS

Figure C.15
SOUND LEVELS (L_{dn}) CALCULATED AT CEMENT PLANT "A" (dBA)

SOURCE: Environmental Science and Engineering, Inc., 1977.

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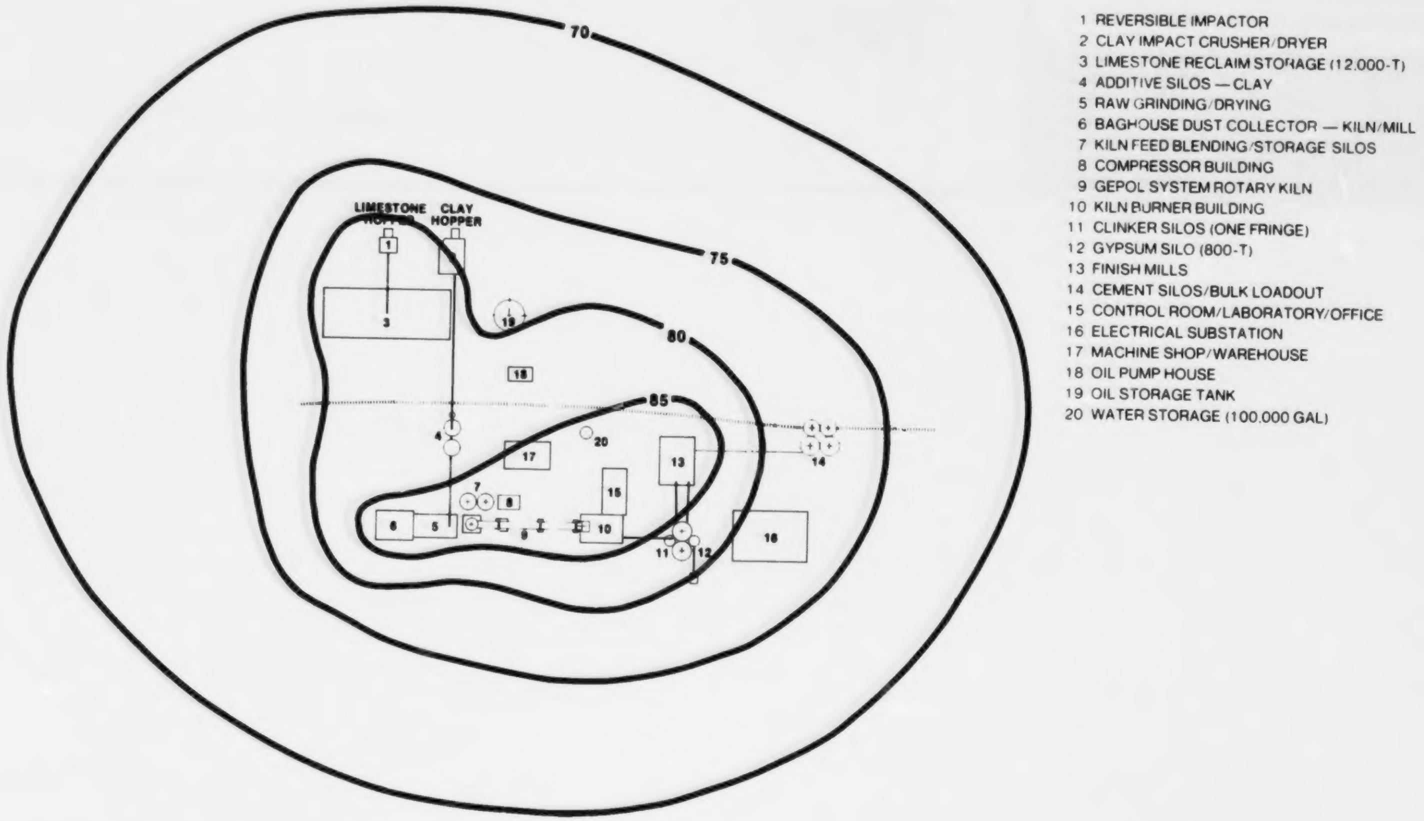
70
75
80
85
LIMESTONE HOPPER
CLAY HOPPER
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
1 REVERSIBLE IMPACTOR
2 CLAY IMPACT CRUSHER/DRYER
3 LIMESTONE RECLAIM STORAGE (12,000-T)
4 ADDITIVE SILOS — CLAY
5 RAW GRINDING/DRYING
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11 CLINKER SILOS (ONE FRINGE)
12 GYPSUM SILO (800-T)
13 FINISH MILLS
14 CEMENT SILOS/BULK LOADOUT
15 CONTROL ROOM/LABORATORY/OFFICE
16 ELECTRICAL SUBSTATION
17 MACHINE SHOP/WAREHOUSE
18 OIL PUMP HOUSE
19 OIL STORAGE TANK
20 WATER STORAGE (100,000 GAL)
0
100
SCALE IN METERS

Figure C.16
EQUAL SOUND LEVEL (L_{dn}) CONTOURS AT CEMENT PLANT "A" (dBA)

SOURCE: Environmental Science and Engineering, Inc., 1977.

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Impacts of the Ideal Basic Industries Facility

The data generated from Cement Plant "A" is not entirely adequate for impact predictions for the Ideal Basic Industries facility. Fortunately, however, the major plant elements at Ideal Basic Industries will be located within an area roughly equal to that of Plant "A." The assumption was made that with three times the production, the sound power levels from the Ideal Basic Industries facility would be roughly three times as great as the levels at Plant "A." This assumption was made to take into account the differences between the two plants and the threefold production increase and to present a reasonably conservative noise level estimate of the plant during operations. Tripling the sound power level amounts to a 5 dBA increase to the levels observed at Plant "A". With an addition of 5 dBA to the levels observed at Plant "A," an adequate projection of noise impacts of the proposed facility could be made.

The sound contours from Plant "A" were overlaid upon the Ideal Basic Industries property. Adjustments were made for attenuation due to trees: 5 dBA for thick planting and 2 dBA for sparse planting per 30 meters (100 feet). In no case, however, was more than 10 dBA deducted regardless of the thickness of the planting. The results of the foregoing analysis are displayed in Figure C.17. For the most part, the highest levels of noise generated by the proposed facility are within the Ideal Basic Industries property and towards other industrial areas, except the area south of the channel.

Automobile and Truck Traffic

It is estimated that 135 employees will work at the Ideal Basic Industries facility. These employees will generate over 200 one-way trips to and from the proposed site per day. There will also be between 60 and 100 truck trips to or from the site per day. A comparison of the figures given above with those presented in Figure B.N.3 (present traffic) indicates that traffic to and from the cement plant will have only

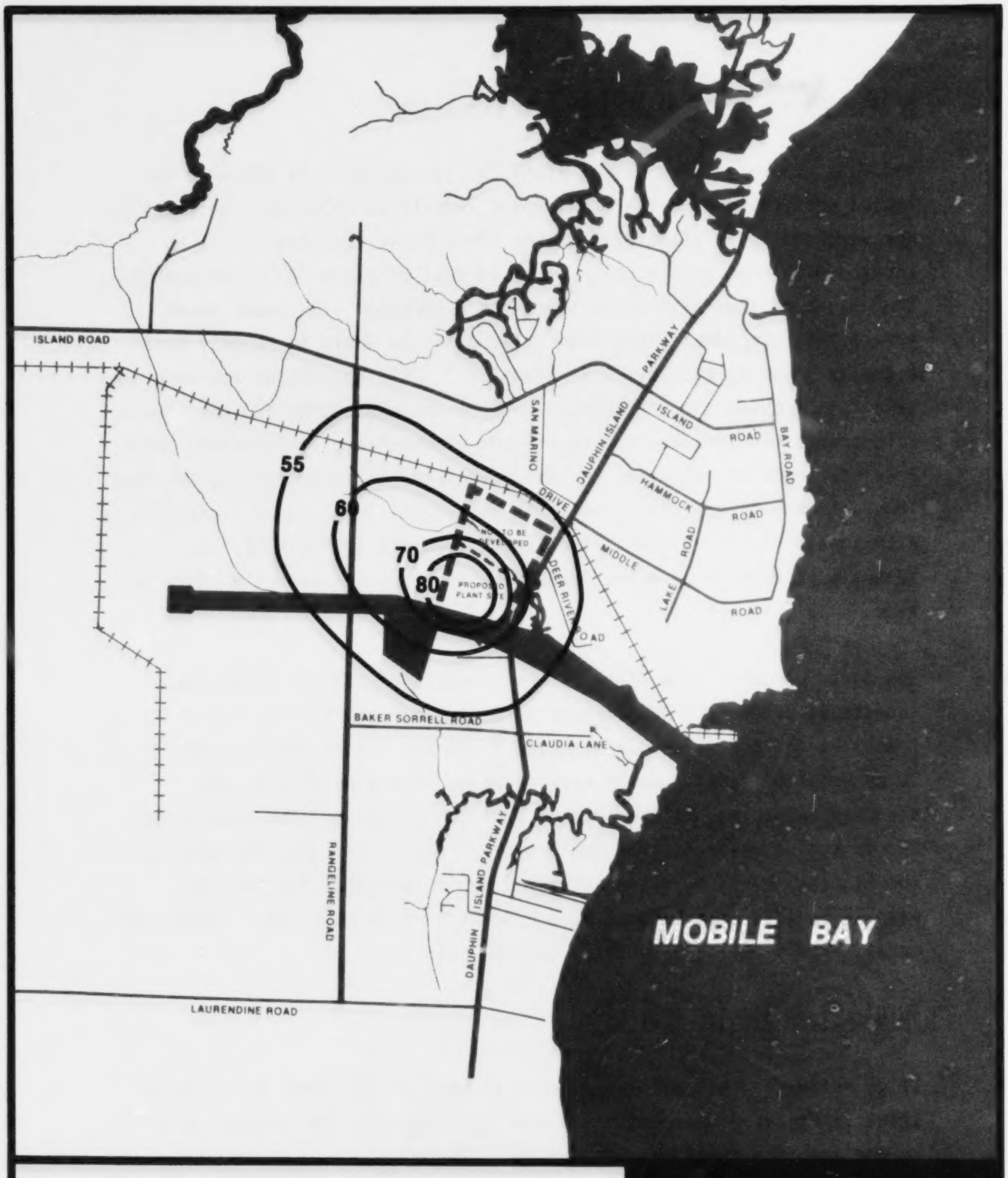
ISLAND ROAD
SAN MARINO
DRIVE
DAUPHIN ISLAND PARKWAY
ISLAND
ROAD
BAY ROAD
HAMMOCK
ROAD
MIDDLE
LAKE
ROAD
ROAD
DEER RIVER
ROAD
55
60
70
80
NOT TO BE DEVELOPED
PROPOSED PLANT SITE
BAKER SORRELL ROAD
CLAUDIA LANE
RANGELINE ROAD
DAUPHIN ISLAND PARKWAY
LAURENDINE ROAD
MOBILE BAY

Figure C.17
EQUAL SOUND LEVEL (L_{dn}) CONTOURS DUE TO PLANT OPERATIONS ONLY

0 0.5 1
SCALE IN KILOMETERS

N

SOURCE: Environmental Science and Engineering, Inc., 1977.

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a small impact on noise stations along Rangeline Road, Island Road, and Dauphin Island Parkway. Noise due to the traffic associated with the proposed cement plant will be no more than 1 dBA (as $L_{eq(24)}$ or L_{dn}) greater than traffic noise without the proposed cement plant. Peak traffic noise levels would increase by no more than 2 dBA (as L_{10}) at any site.

Predicted Noise Levels at Baseline Monitoring Stations Upon Completion of the Proposed Project

Upon completion of the cement plant, the ship channel will not yet be fully utilized. Initially, therefore, the operation of the Ideal Basic Industries facility will have a major impact on noise levels in the vicinity of the proposed site. The "start up" noise levels for the operation of the cement plant are given in Table C.7 (see Figure C.13 for monitoring station locations).

Predicted Noise Levels at Baseline Monitoring Stations in 1992

The impact of the Ideal Basic Industries project in the vicinity of the proposed site should be evaluated in relation to the differences between future noise levels with and without the proposed cement plant. The 1992 no-action scenario is discussed in Appendix E, Alternatives. Data from this analysis is included in Table C.8 for the purpose of comparing the no-action alternative with the impact of the proposed cement plant.

The stations representing residential areas along the ship channel (Nos. 8, 9, and 10) should have initial noise level increases of from 5 to 10 dBA from the operation of the cement plant. However, by 1992, background levels (without the cement plant) should increase at these stations due to greater channel use. At this time the differential of noise levels with and without the cement plant should range from 2 to 3 dBA.

Table C.7. L_{dn} and $L_{eq(24)}$ Noise Levels (dBA) Predicted in the Vicinity of the Plant Site During Initial Operation of Proposed Facility (1981)

Station	Baseline		Baseline and Plant Operation		Change in Noise Levels	
	L_{dn}*	$L_{eq(24)}$*	L_{dn}	$L_{eq(24)}$	L_{dn}	$L_{eq(24)}$
1	55	48/70	63	57	8	9
2	54	49/70	80	74	26	25
3	48	45/70	58	52	10	7
4	72	66/70	73	67	1	1
5	48/55	45	55	51	7	6
6	65	61/55	66	62	1	1
7	55	53/55	55	53	0	0
8	55/55	48	62	56	7	8
9	53/55	51	63	57	10	6
10	54/55	52	63	57	9	5
11	67	59/70	†	†	--	--
12	67/55	66	68	67	1	1

* Second numbers refer to the sound levels requisite to protect public health and welfare according to land use (see Table B.N.2).

† No estimate since the station is in the area of the future turning basin.

Source: Environmental Science and Engineering, Inc., 1977.

Table C.8. L_{dn} and $L_{eq(24)}$ Noise Levels (dBA) in the Vicinity of the Proposed Site Predicted for 1992 (Exclusive of Any New Industries)

Station	1992 Without Ideal		1992 With Ideal		Differences in Noise Levels	
	L_{dn}*	$L_{eq(24)}$*	L_{dn}	$L_{eq(24)}$	L_{dn}	$L_{eq(24)}$
1	60	55/70	64	59	4	4
2	60	54/70	80	74	20	20
3	48	45/70	55	51	7	6
4	81	75/70	82	76	1	1
5	48/55	45	55	51	7	6
6	71	68/55	72	69	1	1
7	55	53/55	55	53	0	0
8	64	57/70	66	59	2	2
9	63	56/70	65	59	2	3
10	63	56/70	65	59	2	3
11	†	†	†	†	†	†
12	72/55	61	73	61	1	0

* Second numbers refer to the sound levels requisite to protect public health and welfare according to land use (see Table B.N.2).

† No estimate since the station is in the area of the future turning basin.

Source: Environmental Science and Engineering, Inc., 1977.

The stations that represent nearby residential areas not along the ship channel are stations 3, 5, 6, 7, and 12. The differentials above baseline levels range from 0 to 10 dBA during initial operations (1981) and the differentials above the background levels (without Ideal) range from 0 to 7 dBA during 1992.

The plant's operations will have several effects in relation to the noise levels suggested by EPA as requisite to protect public health and welfare. Noise levels which would result in hearing loss over a long-term (40-year) period ($L_{eq(24)}$ of 70 dBA) are not projected for any off-site areas. Within the plant site, workers will be protected from excessive sound levels by the plant design which will comply with Mining Enforcement and Safety Administration (MESA) regulations.

The area within the 55 dBA contour line on Figure C.17 and the area immediately outside this contour will have noise levels that could interfere with outdoor communications and activities. Of the approximately 32 houses currently within the 55 dBA or greater area, about 12 will be taken by the ship channel project and another 14 residences are expected to be vacated for industrial/commercial growth by 1992.

In summary, the primary impacts of the operation of the cement plant will be of a moderate magnitude and of low significance due to the number of remaining residences immediately across the ship channel. These impacts will be long-term, but reversible upon plant shutdown. In addition, the noise analysis was conducted without considering the attenuation effects of 20-meter (65-foot) high active and dead storage limestone piles along the eastern boundary of the facility. Due to the size and nature of these piles, significant reduction (10 to 15 dBA) in noise levels can be expected in the area to the east of the plant site. Therefore, the magnitude of the noise impact is slightly conservative for this area. The secondary impacts of the noise generated from the plant and its operation are discussed in the Ecology and Socioeconomic sections.

SOLID WASTE

CONSTRUCTION IMPACTS

The solid wastes generated from construction activities will be dredged material from the dock facility, trees from land clearing, and various construction debris.

Subject to the approval of the Alabama State Docks Department, it is anticipated that the spoil from the dredging operations at the cement plant will be deposited at a U.S. Army Corps of Engineers disposal area. The primary impact of this method of spoil disposal would be of moderate magnitude due to the estimated quantity of 500,000 cubic meters (650,000 cubic yards). The significance of the disposal of dredged materials is considered low since the planned disposal area will also be receiving much larger quantities of dredged material from the ship channel project. However, the impacts will be irreversible and long-term.

The other construction wastes are to be disposed at the Irvington Landfill. The wood wastes from land clearing and the construction wastes from building and clean-up activities will deplete the available life of the Irvington Landfill. This impact would be of low magnitude and significance since these wastes are non-toxic and will not be a major factor in reducing effective landfill life. However, use of a portion of a landfill's capacity for a low-priority waste such as land clearing debris may not be the best use of the available area. These impacts are estimated to be long-term but reversible through future land uses of the fill area. The large bulk portions, such as trees and stumps, would most likely cause operational problems for the landfill in compacting the wastes. Burning or chipping land-clearing wastes may be used in lieu of or in combination with landfilling. The impacts of burning are presented in the Air Quality Impacts section.

If all or part of the land-clearing wastes are chipped for on-site use as mulch, there could be several impacts. First, a positive impact could be the use of the mulch for erosion protection on the perimeter of the work site and for assistance in revegetating specific areas. Second, the equipment needed for chipping would produce high-frequency noise in addition to the other construction noise. However, it is estimated that this additional noise would not significantly affect the levels projected in the Noise section of this appendix and would be for a short duration.

OPERATIONAL IMPACTS

The major components of solid waste from plant operation (refractory bricks, sediment from settling basins, and raw mill rejects) will be disposed at the Irvington Landfill. No adverse impact is expected from landfilling of these wastes (low magnitude and significance; long-term but reversible).

The office and lunchroom paper wastes, as well as the packhouse wastes, represent typical paper and putrescible solid waste and are not expected to present a problem by being buried at the Irvington Landfill. There is a potential leachate problem in relation to part of the oily maintenance wastes and coal mill rejects. However, in comparison to the majority of wastes sent to the landfill from other sources, these wastes are not of sufficient quantity to cause any serious impacts. The impact of these wastes is of low magnitude and significance, long-term but reversible.

A local collection firm will be contracted for transferring the solid wastes to the Irvington Landfill. Removing 2.8 metric tons (3.1 tons) of solid wastes per day and transporting it to the landfill should not have a significant impact on the effective life of the landfill area.

In summary, the primary, long-term impact of the solid waste load from the Ideal Basic Industries plant will be to shorten slightly the active life of the landfill site, but this impact is expected to be of low magnitude and significance due to the small quantities involved and of low significance relative to the overall operation of the landfill.

The reversibility of this waste disposal method is excellent since the sites can be assigned alternate land uses such as parks, parking lots, and office and small business complexes.

WATER RESOURCES AND GEOTECHNICAL

CONSTRUCTION IMPACTS

Stormwater Runoff and Erosion

Extensive land clearing and grading activities at the plant site could result in land erosion and sediment transport during storm events.

Rill and gully erosion may occur in cleared or disturbed areas and transport sediments into the fresh and salt marshes bordering North Fork Deer River and into the ship channel. The proposed use of a settling basin will not completely eliminate the solids content of most of the runoff. Sediment transport could result in localized increases in turbidity. However, turbidity effects on North Fork Deer River should be minimal as the existing marsh will capture suspended particulates and colloidal clays and silts which are washed into it. The impact of this construction turbidity problem in the ship channel could be of moderate magnitude. In relation to offsite stormwater discharges from the channel's entire drainage basin, the quality of the discharge from the Ideal Basic Industries facility will not be significant. These impacts on water quality will be short-term and reversible.

Rail Trestle and Access Road

The construction of the rail trestle and access roadway over North Fork Deer River will cause localized short-term sediment and turbidity impacts of moderate magnitude. The marsh should assimilate these pollutants in a short time, and irreversible water quality degradation of the North Fork Deer River system should not occur. Therefore, the impact is estimated to be of low significance and reversible over the short term.

Ground Water

Clearing and grading, construction of buildings, and other activities at the plant site will cause sealing and compaction of the clayey soils, which will decrease the amount of infiltration and increase surface water runoff. Because of the relatively small area affected, approximately

20 hectares (50 acres), the decrease in infiltration should have a negligible impact on groundwater elevations or quality.

Docking Facilities

Construction of the docking facilities will require dredging of 500,000 cubic meters (650,000 cubic yards) and driving piles along the 716-meter (2,350-foot) waterfront. The bulkhead line will be approximately 60 meters (200 feet) from the toe of the new ship channel. It is anticipated that the dredging for both the plant's dock and the ship channel can be performed during the same time period, and the dredged material can be taken to one of the approved disposal areas utilized for the ship channel project. If these actions could be coordinated, the separate impacts of both projects could be avoided.

The dredging and pile-driving activities of the construction of the docking facility will affect the suspended solids concentrations and the turbidity in the ship channel. This impact is considered to be of moderate magnitude because of the increase in suspended solids concentration and turbidity, but of low significance due to the small portion of the channel affected and due to the short-term and reversible nature of the action.

Oil Spill

Diesel fuel used to power heavy equipment could conceivably be spilled at the plant site. Construction of a berm around the fueling area, along with the exercise of normal safety precautions, will minimize the likelihood that spilled oil would reach surface waters. The magnitude of contamination of surface waters is thus considered very low, and the significance is also low since the amount of water affected would be small. The impact of the spill would be short-term and reversible.

The secondary impacts of the construction activities at the cement plant are assessed in the Ecology section.

OPERATION IMPACTS

Material Spills

Spillage of the raw materials used in the cement manufacturing process could occur. The fact that all of these raw materials are solids rather than liquids will limit the probable magnitude of spills (e.g., a limestone spill would probably be limited to one clamshell load). These materials would tend not to disperse in the environment if spilled and are not considered toxic (Environmental Science and Engineering, Inc., 1977). Containment and removal should not be a problem. Thus the impacts associated with raw materials handling are considered to be of negligible significance.

The present design of the plant shows a 380,000-liter (100,000-gallon) fuel oil storage tank. The tank will be above ground and will have a containment earthen berm of sufficient capacity to hold the entire amount of oil in the tank. Two additional tanks--a 38,000-liter (10,000-gallon) diesel oil tank and a 3,800-liter (1,000-gallon) gasoline tank--are also planned, but are not of primary concern because they will be located underground. The probability of any oil or gasoline reaching the North Fork Deer River or the ship channel is very slight. If a spill flows north, it will be contained by the stormwater catchment area. If a spill flows south into the ship channel, cleanup should be rather easy due to the poor flushing action expected in the dead-end channel. Therefore, if a spill does occur, its magnitude and significance are expected to be low. Any spill would have a short-term, reversible impact.

Wastewater and Storage Pile Runoff

The wastewater from the plant will consist of approximately 140 cubic meters (36,000 gallons) per day of cooling system blowdown, 6.6 cubic meters (1,750 gallons) per day of truck and car washings, 17.7 cubic meters (4,680 gallons) per day of floor washings, 1 cubic meter (190 gallons) per day of runoff from the fuel oil tank and containment berm, and 166 cubic meters (43,800 gallons) per day of runoff from the limestone and wet clay stockpiles. This wastewater will be mixed and treated in the settling pond prior to being discharged into the ship channel. The projected quality of this discharge will meet all applicable state and federal standards and should exceed the quality of receiving waters in the ship channel in terms of critical pollutants. Thus, the primary water resource impacts are judged to be low in terms of both magnitude and significance, but long-term and reversible. Secondary impacts are discussed in the Ecology section.

General Stormwater Discharge

Rainfall runoff from portions of the plant site other than material storage areas and the fuel oil tank will be directed to a grassed catchment area and subsequently discharged to the freshwater marsh north of the plant. The impacts associated with this plan include increased flow into the marsh and possible slight water quality deterioration of North Fork Deer River. It is expected that the runoff to the freshwater marsh will about double due to the increased runoff coefficient of the surfaced areas (buildings, pavements, etc.) and the compacted soils in unpaved areas. In addition, since all of the runoff will be discharged from the catchment area, it will include quantities now draining along the entire boundary of the freshwater and brackish marsh. The water quality of the North Fork Deer River should deteriorate only slightly, if at all, since the catchment area, as well as the marsh, should effectively reduce levels of expected pollutants.

The anticipated magnitude and significance of this impact should be low, but long-term and reversible. This impact could be avoided by discharging to the ship channel.

Ground Water

There are no plans to utilize groundwater supplies at the site; therefore, groundwater depletion will not be an impact. The only substances with potential for infiltration into the groundwater supplies will be leachates from the uncovered stockpiles of clay and limestone. However, infiltration should be minimal or non-existent because of the impervious nature of the clayey soils and the non-hazardous nature of the materials. The impact of such infiltration would be of negligible magnitude and significance.

Sanitary Wastes

Disposal of the sanitary wastes generated at the plant site will produce no water resource impacts since the site will be served by municipal sewer facilities.

Navigation Aspects

The proposed docking facilities are expected to have no adverse effects on traffic in the ship channel due to the deep setback, 60 meters (200 feet), required by the U.S. Army Corps of Engineers.

ARCHAEOLOGY

Research and on-site investigation have determined that no sites of archaeological-historical interest will be impacted by either the construction or the operation of the proposed cement plant. However, should a site be encountered during construction, the Alabama Historical Commission will be notified to appraise the discovery.

ECOLOGY

CONSTRUCTION IMPACTS

Land Clearing and Grading

Land clearing and grading activities will result in the loss of approximately 20 hectares (50 acres) of modified longleaf pine forest. Although this represents a loss of approximately 50 percent of the longleaf pine trees on the property, this impact is of low magnitude due to the early successional state and disturbed condition of the remnant forest (see the Ecology section of Appendix B, Baseline). Natural contributions of nutrients and minerals to the marsh from this section of the remnant forest will be eliminated; however, the amounts are not considered significant. Loss of this modified forest is considered of low significance, irreversible, and unavoidable.

In evaluating the impacts on wildlife habitats, the following standard game management terms were used:

1. Most favorable habitat--areas which provide food and cover in sufficient quantities to support game species at a relatively high carrying capacity.
2. Favorable habitat--areas which support moderate populations of game species, but do not provide optimum conditions.
3. Marginal habitat--areas with less than optimum conditions which still support small populations of certain game species.

In relation to wildlife, land-clearing activities will eliminate approximately 20 hectares (50 acres) of favorable rabbit and quail habitat and approximately 0.6 hectare (1.4 acres) of favorable rail and nutria habitat. Resident wildlife populations described in Appendix B, Baseline (see Table B.E.2) will be disturbed due to the development of 34.4 hectare (85 acres) of the property. These impacts are irreversible and represent a long-term loss of natural wildlife resources at the plant site.

The magnitude and significance of the loss are low for the area because of the commonness of these wildlife populations throughout the surrounding area.

The clearing and grading of the upland portion of the site will reduce possible habitat of 11 animals and 14 plants considered endangered, threatened, or of special concern (see Tables B.E.7 and B.E.8, Appendix B, Baseline). The magnitude of this impact is low because of the low probability of these species occurring on the site. The significance of this impact is considered low because of the availability of similar habitat in the area.

Land Access Corridor

The construction of the access road corridor will disturb about 0.5 hectare (1.2 acre)of wetlands, of which about 0.2 hectare (0.5 acre) will be filled for the roadway embankment. The total freshwater wetland on-site is about 3.0 hectares (7.3 acres).

The disturbed area represents potentially suitable habitat of the river frog. This impact could be important because this species holds special concern status; however, the magnitude of the impact is considered low because of the uncertainty of the river frog's occurrence on this part of the site and the significance of the impact is considered low because of the small area affected.

The construction will also result in a loss of suitable habitat for the nutria and other marsh-associated species, all of which are common. The area affected is located at the edge of the marsh adjoining the Airco access road. Since the freshwater marsh has been substantially altered by the roadway embankment and grading for the Airco plant, this impact is considered of low significance. Although this impact is long-term and irreversible, the magnitude is considered low because such a limited area will be affected.

Dredging

The ecological impacts of the dredging for the plant's docking facility are mainly related to water quality and are discussed in the Water Resource/Geotechnical section of this document. The biological aspects of the proposed dredging are considered to be of low magnitude because of the small area of aquatic habitat affected. The significance is also rated low in relationship to the intended use of the ship channel primarily for transportation purposes. The impact of the dredging on aquatic organisms and habitat is considered short-term and reversible in relationship to the existing levels found in the barge canal.

Noise

Construction noise will affect a small natural area, but few species of wildlife are likely to be disturbed. For these reasons, the impact of construction noise on wildlife is considered of low significance and magnitude, short-term and reversible.

Stormwater Discharges

Until the catchment area has been constructed (approximately 3 months), runoff will be contained or slowed down by temporary berms or ditches prior to flowing directly into the marsh. The resulting silt deposition will lead to the disturbance of small portions of both the freshwater and brackish sections of the marsh. However, since a small area will be affected, the magnitude and significance of this impact are very low.

After the stormwater catchment area is constructed, the runoff from most of the land being cleared and graded will drain into this area. The sediment loading of the runoff should be substantially reduced prior to discharging into the freshwater marsh. Due to the expected level of treatment, the impact on the freshwater marsh is considered to be of low magnitude.

The significance is also considered to be low since any loss of wetland vegetation is expected to be minimal compared to the remaining wetland area. This impact is regarded as short-term, reversible, and unavoidable.

The runoff into the ship channel will be minimal because the existing topography and proposed grading of the plant site will cause most of the runoff to flow to the north. The magnitude and significance of such runoff and the resulting turbidity are negligible.

Oil Spills

As mentioned in the Water Resources/Geotechnical section, there could be some impacts from on-site oil spills during the construction period related to the fueling of the construction equipment. Since the quantities, if any, are expected to be small because of a temporary containment berm, the magnitude of the impact is estimated to be low and the potential harm to both aquatic and terrestrial species is minimal. Therefore, the significance should be low, and the impact short-term and reversible.

OPERATION IMPACTS

Air Emissions

Effects of sulfur dioxide emissions on plants and animals at the plant site and surrounding areas are expected to be negligible. Injury to conifers and hardwoods is reported to occur at annual average concentrations greater than 0.03 ppm. Concentrations of 0.5 ppm for 10 hours in 1 month with momentary peaks over 2 ppm cause slight to severe vegetation injury of an acute nature (U.S. Public Health Service, National Air Pollution Control Administration, 1969). Existing annual averages (.005 ppm) and projected 1980 levels (.005 ppm) for the plant site are well below the injury threshold, and projected 24-hour maximums (.016 ppm) and 3-hour maximums (.145 ppm) are also below the injury threshold.

Equivalent information on the injury threshold from particulate emissions is lacking. However, it is considered that particulate levels will not cause significant injury to vegetation on the plant site or surrounding area (Darley, 1966). Overall air emissions impacts on vegetation during plant operation are expected to be of negligible magnitude and significance.

Noise

Operation noise from the plant is predicted to range from 60 to 80 dBA on the non-developed portion of the site. The highest levels will occur on the plant site proper where little wildlife is likely to be found. At the southeastern edge of the marsh, interruption of feeding and reproduction of some wildlife species is expected (U.S. EPA, Office of Noise Abatement and Control, 1971); however, these effects will be of low magnitude due to the presence of vegetative and storage pile buffers and of low significance due to the relative amount of land area affected. Noise impacts should be long-term but reversible.

Highway Traffic

An increase in "road kills" of "important" (e.g., rabbits) and "non-important" wildlife species (e.g., turtles and armadillos) will result from the increase in traffic to and from the site. The significance and magnitude of this impact are considered negligible in terms of the numbers of animals killed relative to the natural population levels.

Waterway Traffic

Disturbance of shore and water birds is likely to occur as a result of increased boat traffic in the ship channel. This impact is of low significance and magnitude because of the ability of the birds to adapt, the short durations of the disturbance, and the limited number of individuals that will be disturbed.

When the Theodore Ship Channel is completed, tug, barge, and ship traffic will be many times greater than the present traffic on the barge canal. Vessel movements and prop wash will increase vertical mixing of water, thereby disrupting the present oxygen stratification. Lifting oxygen-poor water to the surface could have some adverse effects upon aquatic communities, although the magnitude of impact is difficult to estimate.

The Ideal Basic Industries project will be only one of many possible developments that will contribute to these impacts. Other traffic-generating activities are difficult to forecast at present. However, it is probable that the other developments occupying the ship channel frontage should generate more total traffic than Ideal Basic Industries. For this reason, the biological impact of the water traffic related to the operation of the cement plant is considered negligible in both magnitude and significance.

Wastewater Discharge

Effluent discharges from the Ideal Basic Industries operation are not expected to produce serious ecological impacts, due in part to the treatment provided by settling basins. Toxicity studies have been conducted to stimulate the effects of storage pile runoff as realistically as possible. The basic fish bioassays indicate that the runoff will be non-toxic. It is concluded that the discharges from the Ideal Basic Industries facility will be of a low magnitude and significance, and will be long-term and reversible. Of the other portions of the wastewater discharge, the truck and floor washes will be of similar chemical nature as the piles; the algicide used in the cooling tower will be approved by EPA for its chemical composition; and the containment berm for the oil tank will discharge only stormwater runoff.

Stormwater Discharge

The stormwater runoff from the plant site will be drained north to the catchment area, treated to reduce solids loading, and discharged to the freshwater marsh. The quantity of water will be about double present conditions due to increased runoff characteristics and diversion of some natural drainage. The magnitude of this impact is considered to be low since the level of solids will be reduced. The significance is also low due to the ability of the vegetation to accept the increased flows and loadings. This ecological impact is considered to be long-term but reversible. This impact is avoidable by discharging the runoff to the ship channel.

Oil Spills

As mentioned in the Water Resources section, permanent operations at the Ideal Basic Industries facility will require aboveground storage of about 380,000 liters (100,000 gallons) of fuel oil. A spill into either the ship channel or the North Fork Deer River could have a serious impact upon aquatic biota and waterfowl. However, the possibility of spilled petroleum products reaching surface waters will be minimized by use of a containment berm around the aboveground tank and by the plant site draining into the stormwater catchment area to the north. Therefore, if a spill occurs, its impact should be of low magnitude and significance, short-term and reversible.

General Human Activities

The plant site, including remaining natural areas, will be fenced off. Hunting and other recreational activities will be restricted, thus eliminating any possible impact due to human activities.

SOCIOECONOMICS

CONSTRUCTION IMPACTS

Introduction

The construction phase of the proposed Ideal Basic Industries project will yield major economic benefits to the Mobile area and some adverse social impacts. Since the project will rely heavily upon the resident construction labor force, there will not be an influx of workers large enough to affect the housing market, the adequacy of public facilities, or other social conditions in south Mobile County. Adverse socioeconomic impacts of the construction project should be limited to very localized effects involving highway traffic and sensitive land uses.

Economic Activity

The most important socioeconomic effect of the proposed Ideal Basic Industries construction project is the stimulus provided to the regional economy. Of the total cost of the project at Theodore, estimated at more than $165 million in 1977 dollars, approximately $50 million will be spent in the Mobile metropolitan area. During the 30-month construction period, the overall increment in personal income as a result of the project will be between $30 million and $50 million, depending upon the multiplier used to estimate the spending and respending of income within the metropolitan economy. Although the income effect of the proposed construction project will be widely dispersed throughout the Mobile metropolitan area, at least $10 million, or $5 million per year, should accrue to residents of south Mobile County. The proposed project thus will offset the temporary slump which will be created in 1978 by the anticipated layoff of workers at the Ingalls shipyard in Pascagoula. (Positive impact of a high magnitude and moderate significance of a short-term nature.)

Highway Transportation

Construction activity at the proposed Ideal Basic Industries site will have some effects upon highway traffic flows in the industrial park area. The construction labor force will average approximately 360 workers over the 30-month construction period and will peak at approximately 700 persons. In addition to the auto traffic generated by these workers, some truck trips will be required to bring construction materials to the site. Allowing for carpooling and truck traffic, the construction activity will generate about 900 trips per day on the average, and 1,750 trips per day during the peak construction period (referring in both cases to one-way trips). Access to the construction site will be provided by a road extending north from the northwest corner of the Ideal property to Island Road (Hamilton Boulevard). (Until this access route is passable by construction vehicles and equipment, access will be via a temporary roadway near the southeastern corner of the property.)

The relative importance of these traffic flows can be established roughly by referring to the traffic counts at the Rangeline Road/Island Road intersection mentioned in the baseline description. Table C.9 shows the percentage increases in traffic on Rangeline Road and Island Road which will be attributable to the proposed construction project, under the assumption that the existing counts are representative of conditions without the project. It is assumed that traffic generated by the project will utilize the western section of Island Road (linking to U.S. Route 90 and Interstate 10) to a somewhat greater extent than the eastern section extending to the Dauphin Island Parkway.

Table C.9 indicates that during the peak construction period, the proposed project should not increase traffic on any highway segment by more than 8.3 percent. The average traffic increments for the entire construction period should be no more than 4.3 percent. Therefore, given these relative magnitudes, the proposed construction project should not create any new traffic-related problems in the Industrial Park area, although the project could add to existing unfavorable conditions.

Table C.9. Summary of Traffic Impacts

	Traffic Count, 1977*	Increase in Number of Trips Due to the Proposed Construction Project			
		Average Conditions		Peak Conditions	
		Number	Percent	Number	Percent
Island Road west of Rangeline Road	13,352	540	4.0	1,050	7.9
Rangeline Road south of Island Road	15,306	90	0.6	175	1.2
Island Road between Rangeline and the Ideal Access Road	14,676	630	4.3	1,225	8.3
Island Road east of the Ideal Access Road	14,676	270	1.8	525	3.6

*Based upon a one-day count of traffic approaching the Rangeline Road/ Island Road intersection conducted by the Mobile County Highway Department.

Source: Environmental Science and Engineering, Inc., 1977.

The principal traffic-related problems in the Industrial Park area at present are peak-hour congestion at the Rangeline Road/Island Road intersection and congestion and hazards elsewhere on Island Road. These factors should be largely eliminated when Island Road is widened to three lanes and the intersection with Rangeline Road is improved (see the baseline discussion). Although there may be some overlap between this highway improvement program and the Ideal Basic Industries construction project, the Island Road improvements are expected to be completed before the peak construction period of Ideal Basic Industries. Therefore, the impacts of traffic generation by the proposed construction project are expected to be of moderate magnitude, low significance; short-term and reversible.

Land Value and Land Use

The potential impacts of the Ideal Basic Industries construction project on land use, land value, and general amenity will be limited to a small number of sensitive land uses located near the plant site. Traffic generation should not be an important contributing factor in this regard since the highway corridors to be utilized (i.e., principally Island Road) contain very few sensitive land uses. The primary effects of the proposed construction project on nearby properties are expected to be higher noise levels and some slight increases in settleable dust levels. The most sensitive land areas in question are the residential properties located east of the plant site on the Dauphin Island Parkway and Deer River Road, and the dwellings situated between the ship channel, Baker Sorrell Road, and Claudia Lane.

Two important circumstances regarding these impacts are: (1) a substantial number of the properties under discussion will be taken for construction of the Theodore Ship Channel; and (2) the Ideal Basic Industries construction project will overlap substantially with the ship channel project in terms of timing.

On the south bank of the canal, all of the present dwellings that are directly exposed to noises transmitted across the waterway will be purchased for the ship channel project. North of the canal, the land takings will include one of the two properties which are closest to the Ideal Basic Industries plant site. The total number of dwellings that are vulnerable to value and amenity impacts should be reduced to fewer than 25 in 1980 due to the ship channel project. The time overlap with the ship channel construction project is significant because the relative noise increments due to the Ideal Basic Industries project will be smaller and less critical if the ship channel project is underway (see Noise section of this appendix).

Another important consideration is the 90-meter (300-foot) wooded buffer strip which will be left along the eastern margin of the Ideal Basic Industries property. This strip will constitute a visual screen and will moderate noise and dust impacts east of the Dauphin Island Parkway. These factors, plus the temporary nature of construction activity and the relatively small number of affected properties, mean that the land value and amenity impacts of the construction of the proposed plant are considered moderate in magnitude, low in significance, short-term, and reversible.

OPERATION IMPACTS

Introduction

Permanent operations at the Theodore site will resemble the construction phase of the proposed project in that there will be very large economic benefits but no adverse social impacts of great magnitude. A key feature of the project is that there will be an orderly transition of production workers from the existing plant in Mobile to the new facility at Theodore (after which time the existing plant may be operated by contract labor). This fact will prevent the project from having any significant impacts upon housing, public facilities, or social services in south Mobile County, since there will be no sudden influx of residents to the area. Adverse socioeconomic impacts will be limited, as in the construction phase, primarily to transportation system usage and localized effects on residential land use.

Regional Economic Impact

As mentioned in the project description, the proposed Ideal Basic Industries manufacturing plant at Theodore will employ 135 persons, including 26 management and professional workers and 109 skilled or semi-skilled production workers. The total payroll at the plant will be approximately $3 million per year in 1977 dollars (including fringe benefits).

In addition, Ideal Basic Industries has not decided yet whether it will own and operate its own marine equipment for transporting raw materials and finished cement. In either case, approximately 50 persons will be employed in marine transportation related to plant operations, with an annual payroll of close to one million dollars.

As is typical of highly-capitalized manufacturing operations, the indirect impacts of the proposed plant upon employment and income will greatly exceed the direct impacts. The Ideal Basic Industries operation will purchase a wide variety of commodities within the Mobile SMSA, including transportation, fuels, electric power, water and sewer services, and other assorted services such as engineering. Purchases from the trucking industry alone will support roughly 75 full-time drivers, exclusive of support and maintenance personnel.

The income received by workers at the proposed plant and by employees of firms providing services to the plant will be spent and respent within the local economy and thus will create additional jobs. Local purchases by the latter firms will contribute to this multiplier effect. It is estimated that the total employment impact of the proposed facility within the Mobile Standard Metropolitan Statistical Area (SMSA) will be approximately 500 jobs. This estimate assumes an employment multiplier of 2.7, applied to the 185 jobs directly created in cement manufacturing and water transportation. Such an assumption appears reasonable because the average multiplier for all "basic" employment in the Mobile SMSA is commonly estimated at between 2.0 and 3.0.

The existing Ideal Basic Industries cement plant in Mobile employs approximately 150 workers. As previously mentioned, most of these workers will be transferred to Theodore upon start-up of the new facility. Contract labor will be utilized to keep the old plant in operation at least until the new plant is in full production, and perhaps for a considerable period thereafter. Plans for the new facility have not been predicated upon the immediate closing of the old plant. However, the employment impacts attributed to the Theodore project should be adjusted to reflect the fact that this project will probably accelerate the shutdown of the older facility. Two considerations are relevant in this regard:

1. The existing cement manufacturing plant in Mobile is rapidly approaching economic obsolescence, due in part to shifts in the cost and availability of fuels and raw materials. Therefore, it is very unlikely that this plant would be in operation at the end of the baseline forecasting period (1992) even if the proposed facility at Theodore were not constructed.

2. Employment at the new facility will not exceed employment at the existing plant (excluding water transportation), but the Theodore facility will produce three times as much cement. The indirect employment impacts of the new facility will thus be substantially greater, due to the larger inputs of transportation and other goods and services required. It is estimated that the total employment generated directly or indirectly by the proposed plant at Theodore will exceed by more than 100 workers the corresponding employment effect of the existing facility.

Table C.10 indicates the net employment impact of the Theodore project under the worst-case assumption that the existing plant in Mobile will close soon after completion of the new facility in late 1980. It is assumed that, without the proposed project, the old plant would remain in operation until 1985. The indirect impacts due to construction activity during 1978-1980 are estimated conservatively by utilizing an employment multiplier of only 1.9 (meaning that indirect employment equals 0.9 times direct employment). An employment multiplier of 2.5 is assumed for the existing cement plant.

For each of three time intervals, the first column of Table C.10 lists the total number of workers employed by Ideal Basic Industries and their construction contractors. The second column lists the estimated indirect employment effects. The figures for 1978 through 1980 include employment at the proposed construction project and the existing cement plant, whereas the gross employment effects after 1980 consist of only the proposed new plant. The right-hand portion of Table C.10 pertains to the net effects of the new facility. The employment generated directly and indirectly by the existing plant is subtracted from the gross employment effects for both the 1977-1980 period and the 1980-1985 period, the latter because of the assumption that the old plant would have remained in operation were it not for the new facility.

Table C.10. Gross and Net Employment Attributable to Ideal Basic Industries Under Worst Case Conditions; Mobile SMSA

	Gross Employment Generated By Ideal Basic Industries Operations		Net Employment Attributable to Proposed New Manufacturing Facility			Comments
	Direct	Indirect	Direct	Indirect	Total	
Time Interval						
1978-1980 (24 months)	510	550	360	325	685	Construction phase for new facility; existing plant in operation.
1980-1985	185	315	35	90	125	New facility in operation; old plant shut down as a consequence of new facility.
1985-1992	185	315	185	315	500	Old plant would be terminated with or without the new facility.
Total Man-Years	3,240	4,880	2,190	3,305	5,495	
Average Employment for 14-Year Forecast Period	--	--	--	--	393	

Source: Environmental Science and Engineering, Inc., 1977.

The fourth row of Table C.10 presents the total man-years of employment in the Mobile SMSA which will be generated directly and indirectly by Ideal Basic Industries over the period from 1978 to 1992, if the proposed facility is constructed as planned. The total is more than 8,000 man-years, of which approximately 5,500 man-years represent the net effect of the new manufacturing facility. About 25 percent of this net effect involves construction of the plant, and 75 percent is attributable to permanent operations. As shown by the last line of Table C.10, the net effect amounts to an average of nearly 400 workers employed in the Mobile SMSA because of the proposed project during the 14-year period. Thus, the project should provide a very substantial boost to the local economy even under the worst-case assumption that the existing cement plant is phased out as soon as possible. (Positive impact of high magnitude and moderate significance; long-term.)

Transportation

The transportation requirements of the proposed project at Theodore are discussed in the Resources Required section of Appendix A, Project Description. There will be a heavy reliance on water transportation for delivery of raw material inputs (limestone, clay, sand, iron ore, and possibly gypsum and coal), and for shipments of finished cement. However, significant impacts on the waterway system are not expected to result from this usage.

Ample dockage space will be provided to allow efficient utilization of the waterfront area at the plant site. Sufficient vessel control will have to be exercised to prevent overlapping limestone deliveries, and to prevent deliveries of sand, clay, and iron ore from occurring at the same time. However, the traffic created by the proposed cement plant can be accommodated without disrupting the other anticipated traffic in the ship channel. The downriver shipments of limestone, clay, sand, and iron ore will increase by 5 to 10 percent the total tonnage passing through the Mobile harbor area. Officials of the Alabama State Docks Department feel that this additional traffic will not create any significant congestion problems, although there may be occasions when limestone tows are detained briefly while other vessels are maneuvering (Alabama State Docks Department, 1977).

The Ideal Basic Industries limestone shipments down the Alabama River will more than double the existing freight traffic on the Alabama-Coosa river system. At present, this traffic consists largely of sand, gravel, and crushed rock shipments originating in the southern reaches of the Alabama River. The total volume of shipments in both directions was only 695,000 metric tons (766,000 tons) in 1976 (see Table C.11). The traffic generated by the limestone quarry could thus represent a 300 percent increase in waterborne commerce near the quarry site. Since the present traffic includes an average of only one barge tow and 2.5 other vessels per day in either direction, it does not appear likely that the increased waterway usage will create significant congestion or hazards. (Negligible impact.)

Rail transportation could be utilized for delivering up to 270,000 metric tons (300,000 tons) of materials per year to the Theodore site and for shipping as much as 180,000 metric tons (200,000 tons) per year of finished cement. The outbound rail shipments of cement are likely to be substantially less than the latter figure, however, since rail transportation lacks both the cost advantages of water transport and the speed and flexibility of highway shipment. A potential impact of rail transportation involves the fact that rail traffic to and from the Ideal Basic Industries plant site must utilize a grade crossing of the State Docks Terminal Railway and Rangeline Road (plus an additional grade crossing of Island Road if the traffic is northbound). The Rangeline Road grade crossing will ultimately be eliminated, but will probably be in existence for some time after the Theodore plant is in operation. The potential disruption of highway traffic at this point due to railway usage is considered a very minor impact, however, since even the maximum tonnage figures cited above would imply an average of only 2 unit trains per week. (Negligible impact.)

Table C.11. Alabama River Traffic through Claiborne Lock and Dam, 1976

	Total for Year		Average per Day	
	Up	Down	Up	Down
Number of vessels				
Barge tows	176	181	0.5	0.5
Individual barges:				
Loaded	74	423	---	---
Empty	420	75	---	---
All other vessels	434	502	1.2	1.3
Total tonnage (metric tons)	105,500	589,700	---	---

Source: U.S. Army Corps of Engineers, 1977.

The highway traffic generated by the Ideal Basic Industries plant at Theodore will include auto trips by employees and visitors, and outbound shipments of cement by truck. Auto traffic will average roughly 300 one-way trips per day. Some of these trips will occur during off-peak hours since the plant will be a 24-hour operation. Since this auto traffic will constitute only about a 3 percent increase for Island Road, it is considered a very minor impact. (Negligible impact.)

The truck traffic generated by the proposed facility at Theodore will amount to an average of 380 outbound shipments per week (or 760 one-way truck trips per week), according to present plans. If a 50-hour work week is assumed, there will be a truck entering or leaving the plant site on an average of once every 4 minutes. Truck arrivals and departures actually will be distributed unevenly over time, so that much higher volumes may occur during certain periods. The cement truck traffic could have an appreciable impact upon traffic flows in the Industrial Park area because of the slow acceleration of these vehicles when fully loaded. The magnitude of this impact should decline in 1982, however, when Rangeline Expressway is completed north to Interstate 10, since the expressway should divert traffic away from Island Road. Truck traffic is rated as an impact of moderate magnitude and low significance, and is considered long-term but reversible.

Land Value and Residential Amenity

The proposed Ideal Basic Industries manufacturing facility could have both positive and negative effects upon land value in nearby areas. Positive effects would result from the employment opportunities created at the plant and the general stimulus to economic growth in the industrial park area. Negative effects would involve the reduced desirability of the area near the plant site for residential communities.

An evaluation of positive and negative influences on land value must consider: (1) the distance of land areas from the proposed cement plant;

and (2) the inherent marketability characteristics of existing properties. It is judged that any negative effects of the proposed facility on residential amenity will be negligible beyond a distance of about 1.6 kilometers (1 mile) (assuming that traffic-related effects will not be a problem). Noise impacts will dissipate rapidly over distance.

The marketability question has to do with the ability of residential property owners to sell their properties on favorable terms. As noted in the Socioeconomics section of Appendix B, Baseline, it is judged that the owners who might lack flexibility in this regard would be those whose property values currently exceed $40,000 (which would be generally beyond the means of industrial workers as potential buyers). However, most of the residential properties which fit this description, with the exception of the Deer River properties discussed below, are located 2.4 kilometers (1.5 miles) or more from the proposed plant site, and thus are not vulnerable to amenity impacts.

In several intermediate areas, located between 0.8 and 1.6 kilometers (1/2 and 1 mile) from the proposed cement plant, there may be some amenity impacts, but these are likely to be more than offset by the positive influence of the Ideal facility on land value. These areas include lower San Marino Drive to the north of the plant site and Claudia Lane to the southeast. All of these properties would be highly marketable to industrial workers because of their location, so that owners should have the option of selling on favorable terms.

The residential properties which are considered most vulnerable to net adverse impacts are those located within roughly 1 kilometer (0.6 mile) of the proposed plant. As noted earlier, a number of the dwellings that currently exist in this area will be removed for construction of the ship channel or for conversion of land to industrial use. The land use conversions will be related to opportunities for economic gain created by the ship channel project and would occur with or without the proposed Ideal Basic Industries cement plant. The outcome should be that the number of residential properties vulnerable to net adverse impacts by the cement plant will number fewer than 25 in 1980, and fewer than 10 in 1992. In summary, the land value impact of the operation of the cement plant is considered to be of moderate magnitude but of low overall significance, long-term but reversible.

Local Government

The proposed project may have some effect upon local government expenditures. There will be no major fiscal impacts on local government, however, since the Ideal Basic Industries operation will not generate significant demands for public facilities or services. Security and fire protection for the site will be provided primarily internally. The costs of all utilities provided to the plant will be covered by user charges. Thus, the external costs generated by the Ideal Basic Industries operation should be limited primarily to the construction and maintenance of transportation facilities. Waterways are developed and maintained by the U.S. Army Corps of Engineers and do not involve local expense. The construction of highway improvements serving the Theodore Industrial Park area will be funded in large part by the State of Alabama. Employment at the Theodore plant will not create significant fiscal impacts by attracting new residents, who would add to public service demands, because most of these workers will transfer from the existing plant in Mobile. Therefore, the main costs to local government that might be attributable to the proposed Ideal Basic Industries project will be a minor share of city and county roadway maintenance expenditures, and perhaps a small increment in the general administrative costs of county government. (Negligible impact.)

QUARRY SITE

AIR QUALITY

CONSTRUCTION IMPACTS

Construction impacts associated with the quarry will be similar to those described for the plant site. Actual emissions from construction activities are very difficult to quantify, but are dependent upon the types of operations, the level of activity, and the meteorological conditions. Construction activities at the quarry site will include land clearing, grading, roadway construction, and heavy machinery operations. Fugitive dust will be caused by these activities; suspended dust emissions from heavy construction operations have been generally estimated at 2.7 metric tons per hectare (1.2 tons per acre) per month of activity (U.S. Environmental Protection Agency, 1975).

If permitted by the Alabama Air Pollution Control Commission, the construction wastes of trees and vegetation will be burned in an air-blower type pit burner to reduce emissions.

As in the case of the plant site, effective methods of control such as water sprays and controlled burning will mitigate impacts of construction on local air quality. These measures are discussed thoroughly in Appendix E, Mitigating Actions.

Tentative construction plans for the quarry operation place an 18-month duration on construction activities. The frequency of operations will vary greatly during the construction period. Excavations and land clearing and grading will last approximately 3 months, during which time construction impacts on the local area will be greatest due to the frequency and types of operations conducted.

In summary, construction activities at the proposed quarry site are expected to have a short-term impact in the immediate vicinity of the operations on the quarry property, primarily upon levels of suspended particulate matter. Levels of this pollutant are expected to increase during construction; however, ambient air quality standards are not expected to be exceeded. Impacts in the area (off-site) are expected to be of low magnitude and significance, as well as short-term and reversible. The impact from burning vegetative wastes could be avoided by chipping and landfilling (see Appendix E, Alternatives).

OPERATIONAL IMPACTS

Emissions of fugitive dust from quarrying activities and their potential impacts are difficult to quantify accurately. However, the impacts of quarrying are expected to be similar to the impacts of construction activities. Suspended particulate matter levels will increase on-site during quarrying, and the impacts will be confined to the property boundaries. Much of the fugitive dust generated will settle out in the quarry area. Air quality standards are not expected to be violated. Short-term, localized impacts will depend on the operations being conducted, weather conditions, and the effectiveness of the fugitive dust controls (water sprays) to be used. In addition, the naturally high moisture content of the overburden and limestone should suppress dust emissions.

Because fugitive dust will be the only pollutant emitted in significantly measurable quantities, significant impacts associated with other pollutant releases (such as those from vehicular exhausts) are not expected. No perceptible increases in air quality levels of other pollutants due to quarry operations are expected.

Primary impacts on-site are expected to be of moderate magnitude in the quarrying areas but of low significance due to the lack of receptors. The other process areas which could generate dust (breaker, conveyor, stockpile, barge loader) will use water spray systems, and their primary impacts are expected to be of low significance and magnitude due to the effectiveness of the dust controls. These impacts would be long-term but reversible. Secondary impacts are discussed in the Ecology section.

NOISE

CONSTRUCTION IMPACTS

Noise from construction activities at the quarry will originate from land-clearing and grading operations and from the building of permanent structures, docking facilities, and clarification basins.

Equipment Noise

Equipment associated with earthmoving, lifting, welding, paving, pile-driving, and transportation will contribute to construction noise. Table C.12 lists the types and numbers of equipment originally projected to be used at the quarry site during the highest level of construction activity. This table also includes noise characteristics of each piece of equipment, assuming that each was retrofitted with the most feasible noise suppression devices available in 1973.

Traffic Noise

There will be traffic noise due to the 250 workers who will be commuting to the quarry site at the height of construction and to the associated truck traffic. These noise sources are expected to be intermittent and short-term and to have an impact of low magnitude and significance on the local area.

Construction Noise Analysis

Construction activities are expected to last about 18 months. The height of construction activity will occur between the ninth and twelfth months. Based on information from the contractor, Brown & Root, Inc., 68 pieces of heavy equipment were assumed to be in use between the third and sixth months (the period of greatest noise impact).

For the purposes of this study, it was assumed that at any given time throughout an eight-hour day, 75 percent of the equipment will be

Table C.12. Types, Numbers, and Noise Characteristics of Heavy Pieces of Equipment Required During Busiest Phase of Construction at Quarry Site

Equipment	Number[a]	Noise Level in dBA at 15 meters (50 feet)[b]
Earthmoving		
Dozers	7	80
Scrapers	8	88
Graders	4	85
Loaders	4	79
Rollers/Compactors	3	89
Carry-Alls	4	--
Lifting		
Cranes	2	83
Forklifts	2	--
Welding		
Welders	10	--
Compressors	5	81
Generators	2	78
Paving and Concreting		
Backhoes	5	85
Mixers	2	85
Vibrators	5	76
Concrete Finishers	1	--
Pile Drivers	1	101
Transporters		
Trucks	23	91

Sources: [a] Brown & Root, 1977.

[b] Schomer and Homans, 1975. These are the old (July 1, 1973) G.S.A. standards for government contractors. They were superseded by lower noise level requirements on January 1, 1975. Values from the old standards were used in the models for conservative estimates of expected noise levels.

actually in operation. Furthermore, it was assumed that the characteristics listed in Table C.12 were applicable.

With respect to the precise placement of the equipment, several simplifying assumptions were made. It was assumed that the equipment will be randomly distributed throughout an area measuring 730 by 850 meters (2,400 by 2,800 feet). The effects of 88 point sources were combined and reassigned to nine large identical theoretical point sources.

Construction Noise Impacts

The combined contributions of the nine theoretical noise sources to environment noise levels are displayed in Figure C.18. Since there is sparse forest in all directions, a correction of 2 dBA per 30 meters (100 feet) was made. No more than 10 dBA were subtracted in this manner at any location. The "acorn" shape is caused by the discontinuity of the woods across the Alabama River.

Towards the north, south, and east, noise impacts will not extend off the Ideal Basic Industries/McWilliams property. To the west, noise levels will be above 55 dBA for at least 0.8 kilometer (0.5 mile).

Predicted Noise Levels at Baseline Monitoring Stations

All baseline monitoring stations were located on the east side of the Alabama River and near the property boundaries. At none of the stations will noise levels exceed 55 dBA during the construction phase.

In summary, the primary noise impacts of the quarry's construction activity are estimated to be of low magnitude and significance, short-term, and reversible. The secondary impacts are presented in the Ecology section.

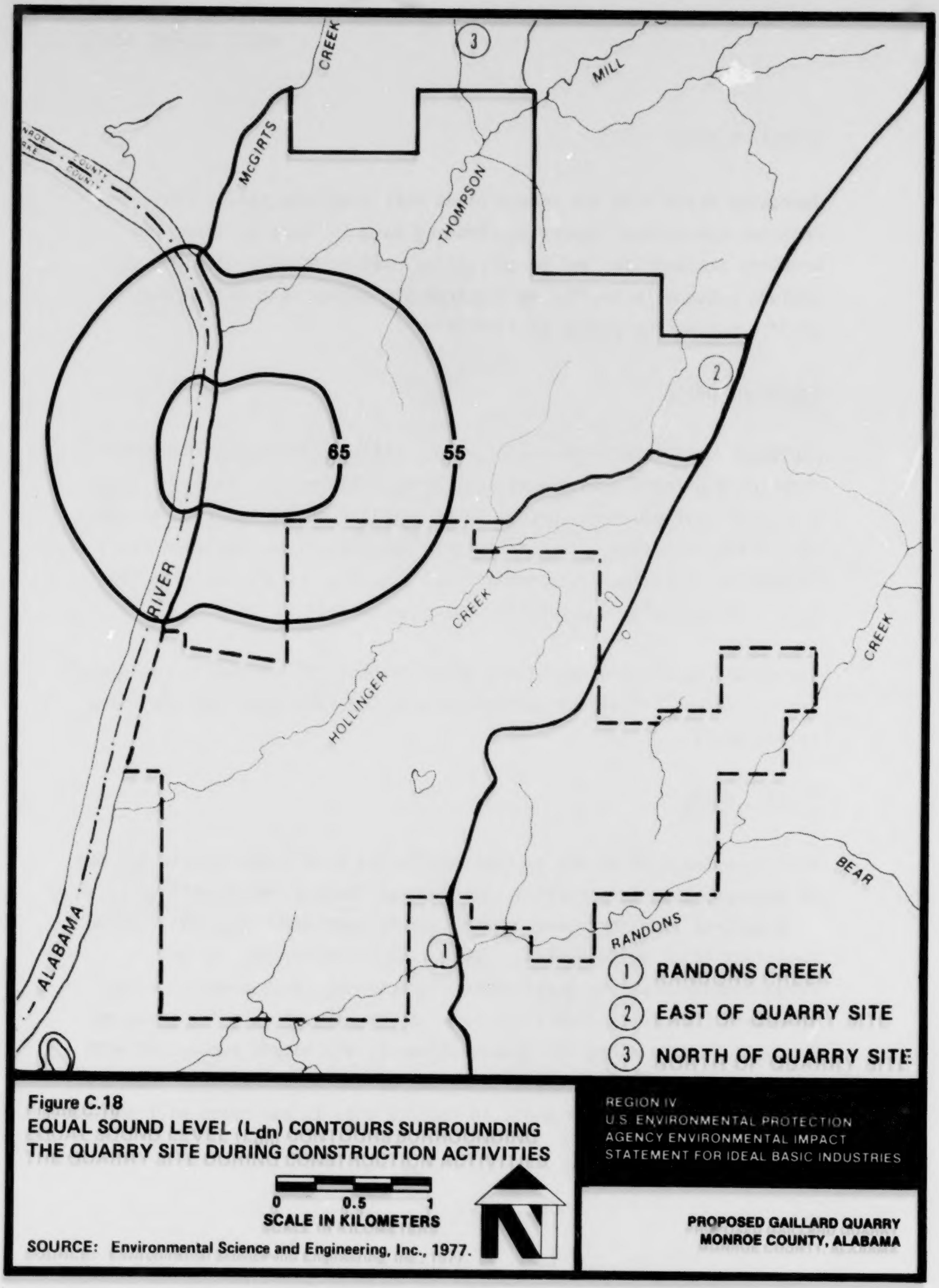
CREEK
3
MILL
McGIRTS
THOMPSON
COUNTY
COUNTY
65
55
2
RIVER
CREEK
HOLLINGER
CREEK
BEAR
RANDONS
1
ALABAMA
① RANDONS CREEK
② EAST OF QUARRY SITE
③ NORTH OF QUARRY SITE

Figure C.18
EQUAL SOUND LEVEL (L_{dn}) CONTOURS SURROUNDING THE QUARRY SITE DURING CONSTRUCTION ACTIVITIES

0 0.5 1
SCALE IN KILOMETERS

SOURCE: Environmental Science and Engineering, Inc., 1977.

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STATEMENT FOR IDEAL BASIC INDUSTRIES

PROPOSED GAILLARD QUARRY
MONROE COUNTY, ALABAMA

OPERATION PHASE

Operation noise from the cement plant will originate mainly from removing overburden, quarrying, loading material onto an apron-fed breaker, stockpiling, and barge-loading. Other sources of noise will include automobile traffic to and from the quarry site and tugboat traffic moving the barges of limestone.

Equipment Noise

Equipment associated with earthmoving, lifting, and transportation will contribute primarily to operational noise. Table C.13 lists the types and numbers of equipment pieces to be utilized at the quarry site during full-scale operation. This table also includes noise characteristics of each piece of equipment, assuming that each was retrofitted with the most feasible noise suppression devices available in 1973.

The noise characteristics of the material-handling equipment (conveyors) are not known, but should be minimized by the fact that this equipment is electrical.

Traffic Noise

Traffic noise will be due to tugs associated with barge traffic and due to employee commuter traffic. The tugboat traffic, which will be of an intermittent and short-term nature, should contribute only slightly to day-night (L_{dn}) noise levels. Table C.14 lists various tug and barge combinations and their noise characteristics at a distance of 30 meters (100 feet) from a channel. Since at most only two trips per day will be made along the Alabama River by tow barges associated with Ideal Basic Industries, these trips may be excluded from this analysis. Commuter traffic was not analyzed because only 19 employees will work at the site.

Table C.13. Types, Numbers, and Noise Characteristics of Heavy Pieces of Equipment Required During Operation of the Quarry Site

Equipment	Number[a]	Noise Level in dBA at 15 meters (50 feet)[b]
Earthmoving		
Dozers	3	85
Scrapers	2	88
Graders	1	85
Loaders	2	79
Tractors	1	92
Pickup	1	-- (85)*
Materials Handling		
Apron-fed Breaker	1	-- (85)*
Belt Conveyors	2	-- (85)*
Stacker	1	-- (85)*

* Assumed for this analysis

Sources: [a] Ideal Basic Industries, Inc., 1977.

[b] Schomer and Homans, 1975. These are the old (July 1, 1973) G.S.A. standards for government contractors. They were superseded by lower noise level requirements on January 1, 1975. Values from the old standards were used in the models for conservative estimates of expected noise levels.

Table C.14. Noise Levels Associated with a Tug and Associated Barges (dBA)

Item	L_{10}	L_{50}	L_{90}
Tug Alone	49	47	42
Large Tug with 4 Barges Loaded	56	55	54
Small Tug with 2 Barges Loaded	56	54	51
Small Tug with Barges Empty	55	51	51
Large Tug Pushing Barge at Dock Area	64	62	58

Source: USC, Incorporated, Consulting Engineers, 1974.

Operational Noise Analysis

For this analysis, the following simplifying assumptions were made: assumption of a flat plain, all noise coming from a single point source, and the use of 100 percent of the equipment at any single time. This assumption is conservative since the equipment used will normally be downslope (towards the Alabama River) in the quarry cut (see Appendix A, Project Description).

Logarithmic addition of the contributions to noise levels of the equipment listed in Table C.1[illegible] yielded an equivalent point source of 97.5 dBA at 15 meters (50 feet). Geometric attenuation accounted for a drop of 6 dBA for every doubling of distance from the theoretical point source. A correction of 2 dBA for every 30 meters (100 feet) of sparse forest was made, although no more than a 10 dBA drop was ever assigned any point regardless of distance. No correction for atmospheric attenuation was made so that the figures for noise levels should be rather conservative. The quarrying plan involves several working faces that will extend outward from the docking facility; therefore, the noise level expected is shown as a 55 dBA line that would be formed approximately 1 kilometer (0.6 mile) from any area to be quarried. Results of the foregoing analysis are displayed in Figure C.19.

Due to their distance from the active quarry sites [a minimum of 3 kilometers (about 2 miles)], it is believed that the baseline monitoring stations will record only a small increase in ambient noise levels.

In summary, the primary noise impacts of the limestone quarry's operation are estimated to be of low magnitude and low significance, long-term, and reversible. No existing residences are projected to be impacted by a noise level greater than 55 dBA from the quarrying activities. The secondary impacts are presented in the Ecology section.

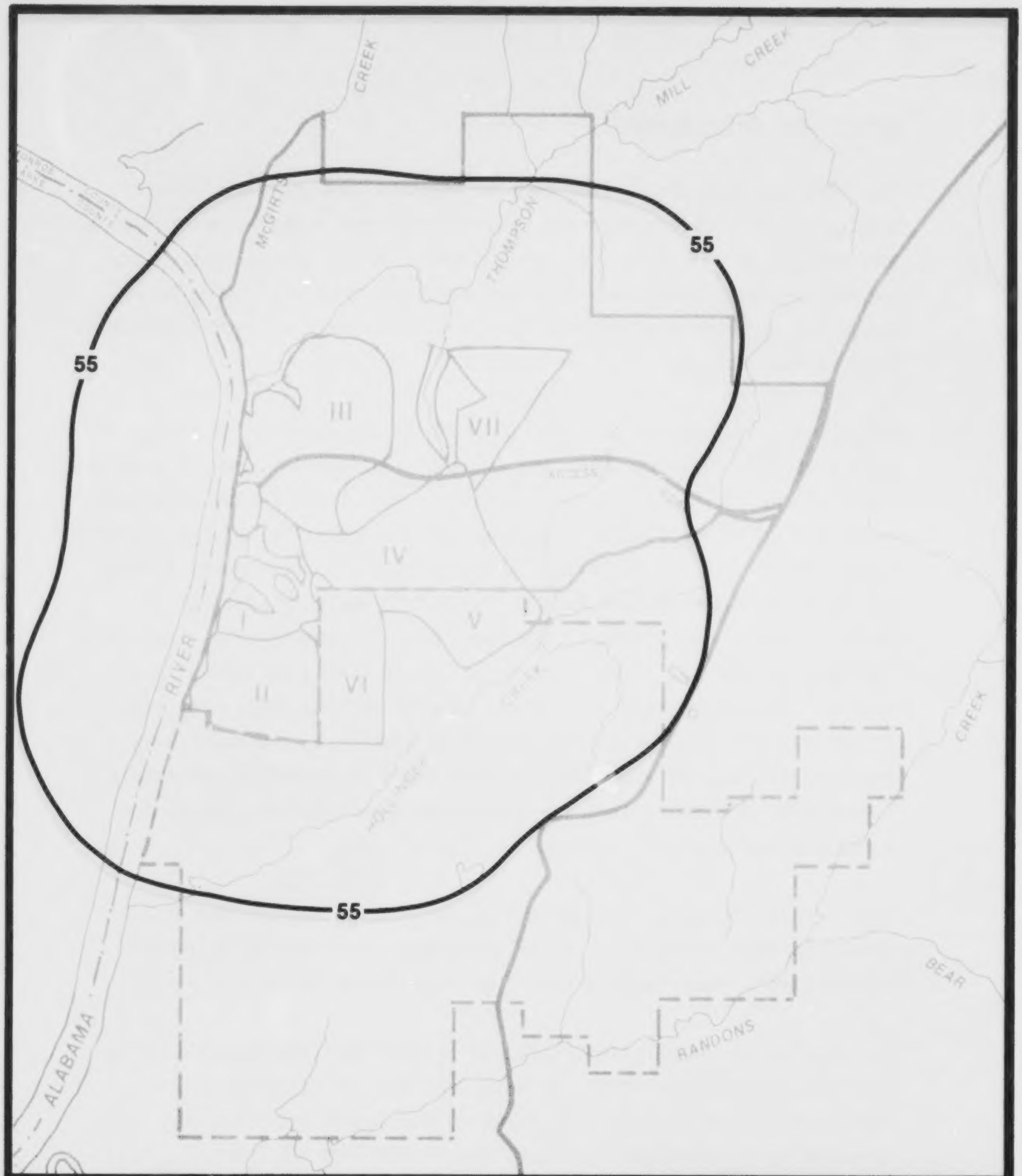
CREEK
MILL CREEK
McGIRTS
THOMPSON
55
55
55
III
VII
ACCESS
IV
I
V
II
VI
RIVER
CREEK
CREEK
BEAR
RANDONS
ALABAMA

Figure C.19
ESTIMATED BOUNDARY OF SOUND LEVEL, L_{dn} of 55 DECIBELS, SURROUNDING THE QUARRY SITE DURING OPERATION

0 0.5 1
SCALE IN KILOMETERS

SOURCE: Environmental Science and Engineering, Inc., 1977

REGION IV
U.S. ENVIRONMENTAL PROTECTION
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STATEMENT FOR IDEAL BASIC INDUSTRIES

PROPOSED GAILLARD QUARRY
MONROE COUNTY, ALABAMA

SOLID WASTE

CONSTRUCTION IMPACTS

The solid wastes resulting from quarry construction include land-clearing wastes (timber) and construction debris.

The proposed action is for the vegetative wastes from clearing 40 hectares (100 acres) to be burned or chipped. Since it is expected that the marketable timber will be removed prior to quarry construction, the remaining wastes will be bulky or will be small pieces of trees and brush. The bulky items are not feasible to be chipped; therefore, they will be burned in an air-blower type pit burner. This type of burning is expected to create less smoke than typical open burning; however, it could still have localized primary impacts of short duration (a 3-month period) and of low magnitude. The significance of these impacts should be low due to the large land area and the sparse population.

It should be feasible to chip the smaller pieces of vegetative waste to be used for mulch on-site. The use of a chipper would produce high frequency noise in the immediate area of clearing, but the impacts are not considered significant off the property. The mulch would be beneficial for use as erosion protection and for revegetation of disturbed areas not to be quarried or utilized during the first few years of operation.

The other construction wastes (lumber, concrete, paper, and metal scraps) will be hauled to the Monroe County Landfill for disposal. The primary impact of this action should be of low magnitude because of the expected small quantities and of low significance because of the non-toxic nature of the wastes and the availability of additional land for solid waste disposal in Monroe County. This impact will be long-term and reversible.

OPERATION IMPACTS

As summarized in Appendix A, Project Description, the quarry operation is expected to generate 137 metric tons (151 tons) of solid wastes per year. About 4 metric tons (5 tons) will be disposed of off-site at the Monroe County Landfill. The only potential problem involves the oily-type wastes which are not feasible for recycling and which, if not properly disposed, might produce a leachate. However, based on the expected quantities, the magnitude of this leachate should be very small and should not cause a serious problem. An advantage of off-site disposal is that it will be performed by a qualified staff working with quantities large enough to promote proper disposal techniques.

The remainder of the solid wastes, approximately 132 metric tons (146 tons) per year, will consist of soil and rock particles removed from the clarification basins. These solid wastes will be used for reclamation and will have an impact of low magnitude and significance in view of the total reclamation operations.

In summary, the primary impacts from the operations of the limestone quarry, relative to solid waste disposal, are expected to have a low magnitude and low significance due to the small quantities of wastes and their methods of disposal. These impacts are considered long-term but reversible since both methods will actually reclaim the disposal areas to other land uses.

WATER RESOURCES AND GEOTECHNICAL

CONSTRUCTION IMPACTS

Clearing and Grading

The clearing and site preparation activities at the quarry will result in increased erosion of the land surface during storm events, even with the proposed erosion prevention methods discussed in the Environmental Safeguards section of Appendix A, Project Description. However, most stormwater runoff from the construction area will be routed through clarification basins where solids levels can be reduced. A settleability study using soils collected at the quarry site has been conducted. Preliminary results indicate that for common hydrologic events, sufficient settling should occur in the clarification basins to allow the effluent to meet the federal suspended solids standard of 30 mg/l if a detention time of 24 hours is maintained.

The outflow from the settling basins may not always meet the desired discharge level during unusual hydrologic events, especially during storms that exceed the 10-year, 24-hour design rainfall, which would cause the basins to overflow. In addition, it will not be possible to treat all stormwater runoff at the start of construction (for example, during the construction of the retention dams). On the other hand, an important characteristic of the project is that all land affected by construction (other than the access roadway) and by the quarry start-up drains either directly into the Alabama River or into the tributary stream reaches that are inundated by the river at high water. The suspended sediment concentrations in the Alabama River are already high and, in fact, tend to exceed the proposed discharge limitation of 30 mg/l except at low flow. Thus, sediment from the quarry construction site should have a primary impact on water resources of a low magnitude and low significance. This impact is reversible and short-term. The secondary impacts are discussed in the Ecology section.

Docking Facilities

Construction of the docking facility at the quarry site will have minimal impacts upon the Alabama River because no dredging will be involved. The particulate material cast into suspension by pile-driving should be of a small quantity. The water quality impact is considered to be low in magnitude and significance, short-term and reversible.

OPERATION IMPACTS

Stormwater Runoff

Erosion and sedimentation will be controlled by contour terracing, grading, vegetation, and clarification basins. Based on the findings of the settleability study, the discharges from these basins should meet the suspended solids standard of 30 mg/l except during a storm greater than the 10-year, 24-hour design storm (both state and federal regulations allow for discharges greater than 30 mg/l during storms greater than a 10-year, 24-hour storm). Therefore, the quantities of solids in the runoff from areas of quarrying and unvegetated reclaimed land normally should be low and should not affect the water quality of the Alabama River and Thompson Mill and Hollinger creeks.

The impact of quarrying should not be as great as the current conversion of forestland to improved pasture which does not include erosion or sedimentation controls. The water quality impact of stormwater runoff should be of low magnitude because of the effect of the erosion controls and clarification basins and of low significance relative to the effects of land conversion to pasture and to the baseline water quality of the Alabama River. These impacts are considered long-term but reversible.

Sanitary Waste

The sanitary wasteloads from the 19 employees of the quarry will be treated in a septic tank and soil absorption system. This method of sanitary waste disposal is not expected to have impacts on surface water or groundwater quality (negligible impact).

Material Spills

The barge loading operation should not significantly affect the Alabama River or its shoreline; however, it is possible that some of the limestone will be spilled into the river. Large limestone spills would be removed from the river channel; however, due to its chemical nature, limestone will not adversely affect the water quality of the Alabama River. Therefore, these impacts are assessed to be negligible. Oil spills are not anticipated due to the use of an underground tank.

Navigation

The proposed barge-loading terminal should not significantly affect the safety of navigation on the Alabama River. At the proposed site the river is approximately 180 meters (600 feet) wide while the docking facilities will protrude only about 28 meters (90 feet) from the east bank. No adverse impacts are expected.

Topography and Drainage

The major geotechnical impact at the quarry site will be the change in land forms resulting from quarrying operations. The elevation of the land will be reduced by approximately 8-15 meters (25-50 feet) and will result in a gently rolling terrain sloping to the southwest. The lower areas will be elevated sufficiently above the river to be reclaimed for pasture or other use. Whenever possible, slopes will be limited to a maximum grade of 3:1, and surfaces will be graded so that there is a smooth transition from disturbed to undisturbed areas. Overall land slopes at the quarry site will be somewhat less than under present conditions.

The reclaimed areas will contain a soil that will be a mixture of the various baseline horizons. Topsoil will be replaced as the surface horizon to help establish vegetation for pastureland and to control erosion. A small amount of limestone is expected to be removed during overburden removal operations and will be mixed with the various horizons.

The drainage areas for Thompson Mill (Marshalls) Creek and Hollinger Creek will also be altered slightly. Some of the tributary valleys may be eliminated, but the channels of Thompson Mill and Hollinger creeks will remain with at least a 30-meter (100-foot) setback from developed areas. The final drainage pattern is expected to follow the quarry floor in a southwest direction and to reduce the Thompson Mill Creek watershed by about 10 percent. The areas south of the clarification basins probably will drain into Hollinger Creek and thus would increase slightly its watershed area.

Although irreversible and long-term, the overall geotechnical impacts of quarrying operations are considered of low magnitude and significance (see Ecology section for secondary impacts).

Ground Water

No adverse groundwater impacts are expected as a result of quarry operations. The existing aquifer system includes sand/clay layers and permeable limestone formations overlying the relatively impermeable Yazoo clay. Given the present discharge situation along the creeks and river (i.e., springs and seeps), it is likely that the water surface is drawn down close to the Yazoo clay contact, which will be 3 to 5 meters (10-15 feet) below the quarry floor.

During quarrying operations, the water table should not be affected at distances greater than about 60 meters (200 feet) from the quarry face. After reclamation, the sand/clay aquifer system at the site may be re-established in the reclaimed land when the sediments are mechanically redeposited. Because of the reduced relief, infiltration may be greater than at present, and sediment transport may be lower than before the quarrying operation. The aquifer systems beneath the Yazoo clay are protected from infiltration of quarry runoff by the impervious nature of the Yazoo clay.

Significant amounts of groundwater, other than for employee use [1.8 cubic meters per day (475 gpd)] are not anticipated for the quarry operation, so that drawdown in the lower aquifer is estimated to be negligible.

The primary impact on groundwater supplies is of low magnitude due to possible localized drawdown in the sand and limestone aquifer caused by quarrying activities. Since this impact is estimated not to affect off-property wells, it is of low significance but will be irreversible and long-term.

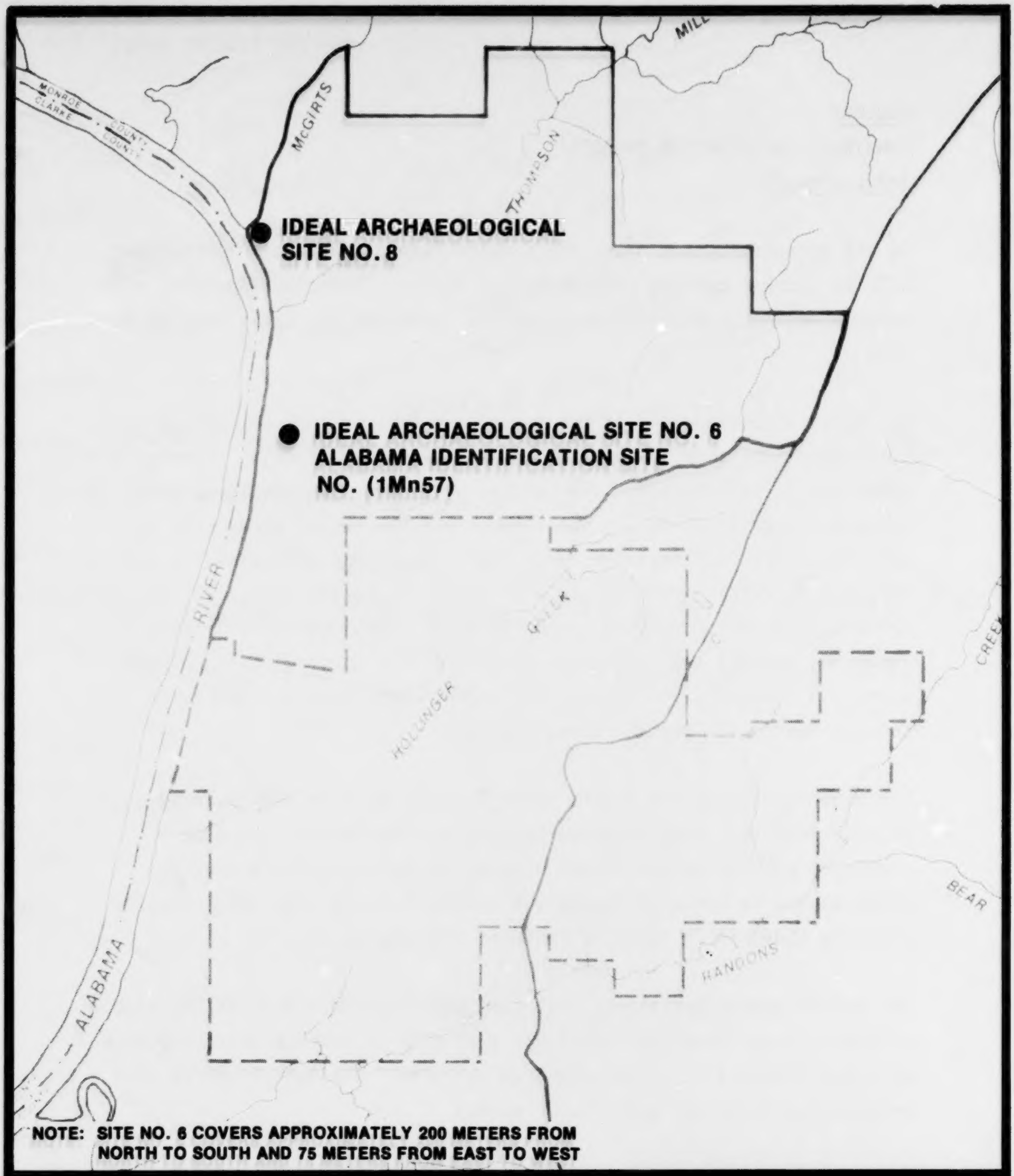
ARCHAEOLOGY

In accordance with the Ideal Quarry Plan, archaeological Site No. 8 will not be disturbed by the quarrying activities. Site No. 6, however, will probably be disturbed as it is located in the area expected to be quarried within the first 15 years (see Figure C.20 for locations of these sites).

A copy of the archaeological/historical survey of the quarry site was sent to the Alabama Historical Commission on August 11, 1977, along with a description of the Quarry Plan. The Commission concurred with the archaeologist that disturbance of Site No. 6 could result in the irretrievable loss of potentially valuable information critical to our archaeological-historical understanding of the past.

On August 29, 1977, the Alabama Historical Commission, office of the state historic preservation officer, stated that their approval of the quarrying activities would be contingent upon test excavations of Site No. 6. The University of South Alabama Archaeological Laboratory was then contracted to perform the necessary test excavations. The name of Site No. 6 was changed to Site No. 1Mn57 to conform to the standard system of numbering archaeological sites in Alabama.

The test excavations have been performed and the archaeologist's final report was submitted to the Alabama Historical Commission early in March, 1978, with a complete account of the required test excavations. This report included a description of the salvage activities, and the approval of the Alabama Historical Commission is pending. Since the area must be approved by the Alabama Historical Commission prior to quarrying, the impact of mining the area should be of negligible magnitude and significance. However, if during construction or operation of the quarry, another site is encountered, the Alabama Historical Commission will be notified to appraise the discovery.


MONROE COUNTY
CLARKE COUNTY
McGIRTS
THOMPSON
MILL
RIVER
ALABAMA
CREEK
HOLLINGER
CREEK
BEAR
RANGONS

IDEAL ARCHAEOLOGICAL SITE NO. 8

IDEAL ARCHAEOLOGICAL SITE NO. 6 ALABAMA IDENTIFICATION SITE NO. (1Mn57)

NOTE: SITE NO. 6 COVERS APPROXIMATELY 200 METERS FROM NORTH TO SOUTH AND 75 METERS FROM EAST TO WEST

Figure C.20
LOCATIONS OF ARCHAEOLOGICAL SITES NO. 6 AND NO. 8

0 0.5 1
SCALE IN KILOMETERS

SOURCE. University of South Alabama, Archaeological Research Laboratory, 1977.

REGION IV
U.S. ENVIRONMENTAL PROTECTION
AGENCY ENVIRONMENTAL IMPACT
STATEMENT FOR IDEAL BASIC INDUSTRIES

PROPOSED GAILLARD QUARRY
MONROE COUNTY, ALABAMA

ECOLOGY

CONSTRUCTION/OPERATION IMPACTS

Introduction

At the proposed quarry site, the construction and operation activities will be similar and are considered one action. These actions will have impacts on the population and community levels of the ecosystems on the site.

The field investigations in the summer and fall of 1977 determined that portions of the area south of Thompson Mill Creek are being timbered and converted to pastureland. The impacts of this action are independent of the quarry construction and operation since they would occur even without the quarry facility. The worst-case conditions for assessing the impacts on existing communities will occur if the timbering/pastureland conversion is not completed by the start of construction activities. In addition, because the ecological impacts of the conversion, construction, and quarrying activities are interrelated, they are discussed together but distinguished where possible.

The construction of the access road, docking facility office, shop, storage facility, clarification basins, and the initial conveyor corridors will be accomplished in about 18 months. This activity, which should be centered around the docking-storage area, will involve clearing and grading about 40 hectares (100 acres).

The actual quarry operations will work away from this area at the rate of about 14 hectares (35 acres) per year with an average quarrying area of about 120 hectares (300 acres) at any time. The entire quarry site encompasses 1,633 hectares (4,035 acres).

Quarrying may include up to 80 percent of the site during the life of the project. Overall, the negative impacts of quarrying after conversion to pasture are considered small. These impacts are not reversible over the short term (approximately 20 years); however, depending upon the management practices, they could be reversed to some extent over the life of the quarry.

Impact Identification

Land Clearing

Much of the information available on soil-vegetation disturbance describes timbering (clearing) and heavy machinery impacts. Since the equipment is similar to that used in facility construction and quarrying, the impacts are considered comparable.

The initial disturbance of existing vegetation in the first 15 years represents the most immediate impact. As the land is cleared and the topsoil removed, 120 hectares (296 acres) of cultivated croplands or pasturelands, 139 hectares (343 acres) of hardwoods, and 30 hectares (74 acres) of remnant forests will be eliminated from these uses.

These actions will alter significantly the present ecological functions and attributes of the site. The system will have the functional characteristics of an early successional state (Odum, 1971).

For example, forests and pasturelands are very important as stabilizers of slopes (Bullington, 1971). Removal of the vegetation will increase erosion and nutrient leaching of any remaining soil and will cause soil compaction as a result of decreased mechanical disturbance from root penetration.

Moehring (1970) suggests three major influences of logging activities on soil structure: compaction, puddling, and soil displacement. Compaction and puddling essentially cause increased surface runoff since percolation and macropore volume are reduced. These two processes decrease the permeability of the soil to both roots and water. Establishment of plants following compaction and puddling is slow. If the soil does not erode severely and if disturbance is not deep, soil displacement will allow mixing of mineral and organic layers of the soil and increased aeration and thus can be beneficial to future vegetation. Soil disturbance which results in scalping or erosion usually permanently reduces the potential of a site (Moehring, 1970). The effects of quarrying are comparable but should be better controlled and less severe due to the reclamation program planned for the quarry area.

Any forests which are left on the site during the quarrying activities may be affected by the quarry. Some of the lower floodplain forest may remain; however, the increased surface runoff, insolation, and airflow will cause changes in composition and production of these remnant areas.

Surface runoff will increase greatly with compaction of the soil, and the removal of topsoil and vegetation on upland areas. The more hydric species will remain in lower areas, whereas mesic or xeric species will shift up the slopes to drier regimes. However, if the drier areas are being actively quarried, the mesic to xeric species will simply lose their niche in that immediate area (the site).

Insolation of the remnant forests will increase, causing increased temperatures within the forests. The opened areas will develop more weedy species and primary woody invaders, such as pine and sweetgum (Chapman, 1946; March and Skeen, 1976). Most of the forest areas remaining after excavation will be hardwood bottomlands, since the pine-oak upland areas will have been destroyed during the quarrying.

Although the plant communities which will be affected are not unique, the impacts represent a major change in the natural systems of the site. The magnitude of these impacts is considered low because of the abundance of the existing forested areas in the area. The significance of the secondary impacts on soil and erosion is low because these actions will probably not have a long-term effect on subsequent land use.

At least 56 hectares (138 acres) of most favorable rabbit and quail habitat, 93 hectares (230 acres) of most favorable turkey habitat, and 21 hectares (51 acres) of most favorable squirrel habitat will be lost in the first 15 years. An additional 122 hectares (302 acres) of marginal rabbit and quail habitat, 85 hectares (210 acres) of marginal turkey habitat, and 158 hectares (389 acres) of marginal squirrel habitat will also be lost. Continued clearing of the hardwood forest and subsequent conversion to pastureland will destroy soft mast-producing plants (oaks, beech, and gum) and hard mast trees (hickory and walnut). In addition, many forage plants associated with the upland forest will be lost. These actions will reduce current population levels of deer, turkey, and squirrel on the site. If the bottomlands are harvested to a great extent, additional food supplies, plus cover, denning, and nesting sites for some animals will be destroyed. Animal species which commonly utilize these areas for feeding, cover, or denning sites include deer, turkey, squirrel, bobcat, raccoon, opossum, mink, gray fox, and woodcock. At most, 178 hectares (440 acres) of favorable rabbit and quail habitat and a similar amount of marginal squirrel habitat will be lost.

In general, the impact of these on-site activities is the resulting changes in wildlife populations from forest types to old field/pasture types; however, the magnitude of these changes is low because of the relatively small amount of affected area in comparison to the areawide abundance of available forest habitat. The significance of this wildlife habitat loss is low because of the frequent occurrence of the species involved in the surrounding area. All the populations in the area are currently self-sustaining.

The major impact of these activities on rare and endangered species will be reduced habitat for those animals which inhabit forest or forest/field communities. The disturbance of sensitive fauna inhabiting aquatic environments will be minimal. The overall impacts should not be significant because of the small areas to be affected and the availability of suitable habitat in nearby areas.

In summary, the land clearing activities associated with both conversion to pasture and quarrying can be expected to have impacts of low magnitude and significance on the area. Impacts are considered unavoidable and reversible over the long term. If pasture conversion is complete by the time quarrying activities begin, the significance and magnitude of the impacts described above will be lower since major transitions in ecosystem types, wildlife habitat types, and wildlife populations will have occurred. However, at this time it is not certain how much of the land conversion will be done before facility construction and before each area is to be quarried.

Erosion and Stormwater Runoff

Erosion and stormwater runoff from the proposed quarry site during construction and operation will be controlled by berms, grading, and clarification basins; however, it is expected that some moderate net increases in the loads of particulate material carried by tributary streams will occur. The presence of this material could be detrimental to aquatic organisms (e.g., through damage to membranes), and the accompanying increase in turbidity could reduce primary productivity. In addition, settling of particulate material on the substrate could smother bottom-dwelling organisms. These impacts are considered of limited significance because erosion controls will limit sediment loads and the ecological adjustment to elevated turbidity levels should have already occurred during the conversion of the site to improved pasture.

Repeated sediment deposition on creek bottom areas, resulting in permanent coverage of the original substrate, could have very significant effects upon aquatic species composition in the tributary streams. The overall effect of sedimentation, organic loadings, and land clearance will be to increase the prevalence of facultative aquatic organisms. Siltation can be expected to create more soft-bottomed habitats which would favor burrowing forms (worms, chironomids, burrowing mayflies) over root, rubble, sand, or gravel inhabitants. Filter feeders (Hydropsychid caddisflies, blackflies, etc.) may be expected to prosper so long as available attachment substrate remains exposed. The removal of trees and their detrital components, such as leaves, twigs, and bark, may eliminate the larger grazers and carnivores of the present system (mayflies, elmid beetles stoneflies, dragon and damsel flies, and members of the Megaloptera).

In Thompson Mill and Hollinger creeks, such effects will occur first as a consequence of land conversions to improved pasture, and later as a joint result of agricultural land use and the quarrying project. The net sedimentation effects of the Ideal Basic Industries project alone would probably not be sufficient to cause pronounced changes in ecological conditions. This impact related to quarry activities is judged to be of low magnitude based on the erosion/sedimentation controls planned. The significance is low by itself and considered even lower due to the changes that should have occurred due to the conversion to and use as pasturelands. Impacts should be long-term (life of the quarry) and mostly reversible.

Fugitive Dust

As presented in the Air Quality section, limestone dust may enter the atmosphere from quarry operations. Brandt and Rhodes (1972) showed reduced productivity of plants which were exposed to limestone dust. These results indicate the possibility of reduced productivity of the remaining forest species at the perimeter of the quarry. The effects are considered to be of low significance and magnitude because of the commonness of the species involved and the relatively few trees to be affected, and the effects will be long-term but reversible when the quarry area is reclaimed.

Noise Disturbance

Noise resulting from construction and quarrying (see Noise section) will have adverse effects on some species of wildlife, such as the turkey, which requires a fairly high degree of isolation. This disturbance could contribute to the reduction of some wildlife populations remaining on the site. It is not considered significant to the area and region because of the frequent occurrence of the species. This impact is considered of low magnitude and long-term, but highly reversible.

Reclamation

Once reclamation is completed, the expected changes in topography will not affect plant or animal communities relative to pasture activities, and no adverse ecological impacts are expected.

Land Transportation

Increased traffic in the area because of the quarrying operation will increase "road kills" of wildlife in the area. The significance and magnitude of this impact are considered negligible because the species involved (e.g., armadillos, opossums, mice, turtles, and deer) are common and occur in large numbers in the area.

Water Transportation

The increased barge traffic, especially in the immediate vicinity of the site, could disturb activity patterns of water-associated birds, such as eagles and waterfowl, and could affect alligators in the area. In all cases, the disturbed species will relocate or adapt to the conditions. These impacts are of low significance and magnitude, long-term and reversible.

Clarification Basins

Clarification basins will have the positive impact of creating additional habitat for aquatic-related species such as herons and waterfowl. This impact is mentioned because of the potential use of these basins by little blue heron and other important species after active quarry slopes are no longer drained into the basins. This positive impact is considered to be of low significance and low magnitude for the area because of other existing ponds in the area.

Drainage Patterns

The drainage patterns created as part of the limestone quarrying and reclamation process could reduce the drainage area of Thompson Mill Creek by about 10 percent. This change in drainage area could reduce the base flow of the stream and thereby reduce the extent of flushing, the size and depth of pools, and the length of stream reaches containing water during dry-weather conditions. Such flow reductions would affect aquatic communities. However, since major effects on base flow should not occur, the related impacts are estimated to be of low magnitude and significance but irreversible and long-term.

Material Spills

Some small quantities of limestone may occasionally be spilled into the Alabama River during barge-loading operations. Gravel-sized and larger rock would sink to the bottom with no discernible impact. Fine particles would form a scum on the water surface and would slowly settle into the water column as they were transported downriver. Spillage should have no measurable adverse effects on river organisms because the limestone is non-toxic. Spillage of coarse material may not be detrimental, and the material involved might provide better substrate for benthic organisms than the present river bottom (negligible impact).

Since the proposed fuel oil tank will be underground, oil spills from the tank are not considered a possible impact. However, as a result of the use of tugboats and heavy duty equipment, there is the possibility that small fuel oil spills could occur. Spills would have localized ecological impacts but would not be sufficient in volume to affect a substantial reach of the Alabama River (negligible impact).

SOCIOECONOMICS

CONSTRUCTION PHASE

Pre-mining activities at the quarry site will provide an important economic stimulus for Monroe County and surrounding areas. The 18-month construction phase at the quarry site will require 200 man-years of labor. During this period, employment will average 133 workers and will peak at 250 workers. The latter figure will amount to roughly 3 percent of the total at-place employment in Monroe County. The total wages paid during the course of the construction project at Gaillard will exceed $3,000,000. Also, through the operation of multiplier effects within the Monroe County economy, the project will generate at least $1,000,000 in additional income, and approximately 60 more employed workers. These positive impacts are considered moderate in magnitude and significance.

Timing of the proposed construction activity is fortunate in that the project will follow closely the construction of the Parsons and Whittemore pulp mill at Claiborne. The Parsons and Whittemore project, which is much larger in scale than the quarry project, will be phasing out at the same time that the labor force buildup is occurring for the quarry construction. This situation may allow some direct shifts of personnel and will permit the construction workers to utilize housing and public facilities that currently are used by the Parsons and Whittemore labor force.

The construction labor force residing in Monroe County is somewhat limited because of the small scale of the local economy. Therefore, a majority of the workers on the quarry project will necessarily live elsewhere. Some of these workers will commute to Monroe County on a daily or weekly basis; a few will establish residence in the area for the duration of the project; and several may move to Monroe County on a permanent basis. Currently, transient accommodations and rental housing units are in relatively short supply in Monroe County because of the Parsons and Whittemore project, but this situation should change by the time the Ideal Basic Industries construction project is underway. Relatively few of the non-resident workers at the quarry construction project are expected to bring dependents to the area, because of the limited duration of the project. Therefore, the construction phase is not expected to have negative impacts in terms of public services or municipal finance. Regarding possible social impacts due to the population influx, the experience of the Parsons and Whittemore project indicates that the Ideal Basic Industries construction phase will have no significant adverse consequences for the Monroe County community.

OPERATIONS IMPACTS

Permanent operations at the proposed Gaillard quarry will benefit Monroe County by providing a small but significant number of highly stable, well-paying jobs. The quarry will employ a minimum of 19 workers and will generate approximately $400,000 in wages annually. Local purchases of supplies and services by Ideal Basic Industries (and multiplier effects created by the spending and respending of personal income) will provide additional stimulus to the Monroe County economy. Therefore, it is estimated that the indirect employment impact of permanent operations at the quarry will amount to at least 25 additional workers. These economic impacts are rated moderate in magnitude and significance for Monroe County.

Projections of the overall socioeconomic effects of the proposed quarry are presented in Table C.15. It is estimated that, of the 44 total jobs attributable to the quarry, the number held by Monroe County residents will be approximately 32 in 1985, and 38 in 1992. Thus the project will increase the Monroe County population by about 92 persons in 1985, relative to the projected baseline, and by about 102 persons in 1992. The increases in the number of households will be approximately 30 and 34, respectively. In each case, the increase will amount to one-half of 1 percent or less of the baseline value. Therefore, although the quarry will represent an important economic benefit to the community, its scale

Table C.15. Summary of Quarry Impacts on Monroe County Population and Employment

	Impacts Attributable to Gaillard Quarry Operation		Quarry Impacts as Percent of Baseline Quantities	
	1985	1992	1985	1992
Direct Employment	19	19		
Indirect Employment	25	25		
Total Jobs	44	44	0.53%	0.46%
Resident Employment	32	38	0.39%	0.41%
Population	92	102		
Population per Household	3.1	3.0		
Number of Households	30	34	0.39%	0.41%

Source: Environmental Science and Engineering, Inc., 1977.

will not be sufficient to create stress upon housing, public facilities, or transportation.

The quarry site is very isolated relative to residential areas and other land uses that might be sensitive to nuisances or amenity impacts. Therefore, quarrying operations are not expected to have any direct effects upon off-site land use or land value. A possible indirect effect of the Ideal Basic Industries facility and the Parsons and Whittemore pulp mill might be an increase of land value (for further industrial development) in the Claiborne/Perdue Hill area. However, this would be a very long-term effect probably of minor degree. The quarry project will have no permanent effects on land use at the site since the land will be returned to its intended original condition, improved pasture.

APPENDIX D. MITIGATING ACTIONS

INTRODUCTION

This appendix presents a summary of environmental safeguards which Ideal Basic Industries has incorporated into the project plan to prevent or lessen potentially adverse environmental impacts (see Project Description for additional details about these safeguards).

The appendix also identifies and describes additional measures which might be taken to mitigate the adverse impacts which are assessed in Appendix C. Each mitigating measure is described and is evaluated in terms of its practical use.

PLANT SITE

AIR QUALITY

CONSTRUCTION

Construction activities at the plant site will consist of land clearing, grading, roadway construction, excavating, and other heavy machinery operations. These construction activities can be expected to increase particulate matter (fugitive dust) levels in the local area on a short-term basis. In addition, burning of land-clearing wastes may also affect air quality on a short-term basis.

Fugitive Dust Emissions

Environmental Safeguards

The State of Alabama's fugitive dust regulation requires the use of "reasonable precautions to prevent particulate matter from becoming airborne." Ideal Basic Industries has chosen the most practical method of mitigating dust emissions from unpaved roads and heavy construction operations, i.e., watering on an as-needed basis. The degree of control achieved through watering is dependent on the frequency of application in relation to other factors (frequency of operations, soil, and weather conditions). Watering will induce a crust surface which is partially resistant to traffic movement and will thereby reduce dust emissions. It has been estimated that waterings twice a day can reduce emissions by up to 50 percent (U.S. EPA, Office of Air Quality Planning and Standards, 1975). Water will be applied to dust-generating surfaces, either by portable water sprayers or watering trucks.

In addition, the construction schedule for development of the plant site shows that the main access road will be surfaced as soon as possible, and this action should also reduce the fugitive dust potential related to transportation.

Mitigating Measures

As an alternate mitigative measure to watering, chemical stabilizers can be used to suppress dust emissions. There currently are over 100 chemical products which can be used for this purpose. However, this control is effective only for inactive areas. In areas where traffic or operations occur, these activities will tend to break down the stabilizer. It is estimated that chemical stabilizers can reduce dust emissions from barren, inactive areas by 80 percent (U.S. EPA, Office of Air Quality Planning and Standards, 1975). However, since emissions from inactive areas are generally small in comparison to active areas, this action will not greatly mitigate overall emissions. Two chemical stabilizers are available: a surface stabilizer, and a stabilizer that is actually worked into the soil. Both types generally involve frequent applications and are more costly than watering for dust control.

A second option which could mitigate dust emissions from construction activities would be reduction of the wind speed across exposed surfaces, thereby reducing the amount of wind-entrained dust. Typical methods include enclosures, coverings, or the placement of tall grasses and vegetation adjacent to the barren areas. Because of the relatively short duration of construction activities and the types of activities conducted, these control measures are usually not practical.

A third method of reducing dust emissions is the paving of all construction roads. This method would be impractical during construction activities because the heavy machinery traffic would quickly break up the road and thus necessitate repaving.

Burning of Vegetative Wastes

Environmental Safeguards

A burning permit issued by the local air pollution control agency is required in order to burn vegetative wastes in Mobile County. The major permit requirements in order to lessen possible effects include burning only during days with proper dispersion conditions (no stagnant air masses) and starting and maintaining fires without using fuel oil or tires.

The wastes will be allowed to dry for a few days. The dried wastes will be burned in an air-blower type pit burner for a substantial reduction in smoke emissions relative to open burning. Burning will be conducted only during favorable dispersion conditions and will be supervised at all times to prevent fire hazards.

Mitigating Measures

There are no additional practical actions which could be performed to lessen the projected impacts from burning vegetative wastes.

OPERATIONS

Adverse air quality impacts associated with plant operation include: fugitive dust generation, particulate matter, nitrogen oxide and sulfur dioxide emissions, and increased consumption of the available Prevention of Significant Deterioration air quality increments for sulfur dioxide and particulate matter.

Environmental Safeguards

To minimize adverse air quality impacts, Ideal Basic Industries will develop an air pollution episode emergency action plan, a routine maintenance and inspection program, a process monitoring program, and an environmental monitoring program. In addition, the best available technology has been used in designing the process and its pollutant controls (baghouses). Storage areas and handling systems will have a water spray dust suppression system to reduce the amount of dust generated. In addition, the plant area will be landscaped to reduce dust emissions.

Process Selection

The plant's process design has inherent features which reduce air pollution potential:

1. Use of a suspension preheater places a constraint on the amount of sulfur which can be contained in the fuel and, as a result, limits the sulfur dioxide emissions.
2. The kiln/raw mill system combines the exhaust gases with the raw material, and the alkaline nature of the raw materials reduces sulfur dioxide emissions.
3. The precalciner will burn about 60 percent of the fuel in the kiln and thereby will reduce the amount of combustion air that will be in contact with the hot end of the kiln. This technique possibly reduces the amount of nitrogen oxides formed in the process (Bauer, 1977).
4. All dust collected in the baghouses will be recycled into the process, thereby eliminating dust emissions from waste stockpiles.

Particulate Matter Controls

The use of "best available control technology" on all particulate matter emission sources is required to insure use of the latest, most practical methods of emission reduction. The design plan of Ideal Basic Industries provides that all stack emissions of particulate matter (including the kiln/cooler/raw mill exhaust streams) will be controlled by the use of baghouse dust collectors, which are considered Best Available Control Technology (BACT). This design feature means that for these sources at the proposed plant, particulate matter emissions will be reduced to near zero visible emissions and to less than 1 percent of their potential emission rate. It has not been demonstrated practical to control stack emissions of particulate matter to a greater degree than is afforded by the proposed baghouse collectors.

Fugitive Dust Controls

The use of landscaping and revegetation will help to reduce fugitive dust emissions from areas disturbed in the construction process. During plant operations, fugitive dust emissions from storage piles, transfer points, barge unloading, stockpiling, and coal crushing operations will be reduced by the following plant design features:

1. Providing water sprays on transfer points, drop points, and on storage piles where appropriate;
2. Installing baghouses at major transfer points and loading operations;
3. Covering coal, dried clay, iron ore, sand, and gypsum storage piles.

In addition to the water sprays, the inherent moisture content (approximately 22 percent) of the uncovered storage piles of clay and limestone will tend to prevent the generation of fugitive dust.

Sulfur Dioxide Controls

Sulfur dioxide emissions from cement plants are not limited by emission regulations; however, two design features of the proposed cement plant will directly mitigate sulfur dioxide emissions. The first is the use of moderate to low sulfur coal with an expected maximum sulfur content of 1.5 percent. With the use of higher sulfur coal, the operation of the preheater unit servicing the kiln is anticipated to be impractical because of formation of sulfate deposits that would restrict gas flow.

The second design feature which will mitigate the potential sulfur dioxide emissions is the inherent removal of sulfur dioxide through the intimate contact of SO_2-SO_3 laden gases with the alkaline cement dust in the kiln/cooler/raw mill gas stream. The following two factors increase the possibility of gas-solid phase contact:

1. All the kiln exhaust gases pass through the preheater and raw mill and thereby have a long contact time with the alkaline material.

2. The particulate matter control devices servicing the kiln/cooler/raw mill exhaust gas streams will be glass fabric filters, on which a dust cake will form. The exhaust gases must pass through this dust cake thus allowing additional contact of exhaust gases with cement dust. Estimated sulfur dioxide removal inherent in this process is 75 percent (U.S. EPA, Office of Air Quality Planning and Standards, 1975).

Nitrogen Oxide Controls

New Source Performance Standards pertaining to emissions from portland cement plants are currently not applicable to nitrogen oxides. However, nitrogen oxides are a product of combustion, and emissions are dependent largely on temperature of combustion and excess air in the combustion chamber. A degree of control over nitrogen oxide emissions will be realized by maintaining these operating parameters within the constraints of the cement manufacturing process. Optimum design of the kiln burning system and the raw mill furnaces will also reduce nitrogen oxide emissions.

As stated under Process Controls, state-of-the-art methods to control nitrogen oxide emissions from cement kilns are at an early stage of development. Ideal Basic Industries will incorporate design features consistent with the latest available technology to help control nitrogen oxide emissions.

Mitigating Measures

Stack Design

Stacks for the kiln/cooler/raw mill at the proposed cement plant will be approximately 90 meters (300 feet) high. The other baghouses are not planned to have high stacks, but will discharge from approximately the height of the fan outlets.

Higher stacks on all emission sources at the proposed plant could further mitigate the impact of emissions on the surrounding area by causing greater dispersion and dilution of emissions before the pollutants reach ground level. Increasing stack heights would also decrease the possibility of downwash of the effluent plume, which could create short-term air quality problems. This mitigating action would be very costly for sources with low emission rates; however, a multiple use stack could be used for combining flows.

Fugitive Dust

There are no additional actions that could be taken to mitigate the low impacts of fugitive dust emissions.

Lower Sulfur Coal

Since sulfur dioxide emissions are a direct function of the coal's sulfur content, the use of lower sulfur coal is an additional measure which could further mitigate sulfur dioxide emissions. However, the resulting decrease in sulfur dioxide emissions would be slight given the inherent reduction by gas-solid (alkaline) reaction. This decrease in emissions would not warrant the additional expense of purchasing coal with less than 1.5 percent maximum sulfur content. In addition, obtaining a continuous supply of such lower sulfur coal would be somewhat questionable in today's energy market.

NOISE

CONSTRUCTION

Increased noise levels are typically unavoidable for construction of facilities as large as the proposed cement plant.

The functions of earth-moving, transportation, lifting, framing, and laying foundations all require the use of machinery which will produce noise that may be objectionable to workers on the site and to some local residents.

Environmental Safeguards

Adverse effects of construction equipment noise will be lessened by the following factors:

1. Use of noise suppression equipment which complies with the Walsh-Healy Act and OSHA regulations. The protection of workers from excessively high noise levels will also reduce noise levels around the site.
2. Whenever possible, construction activities will occur during the daylight hours.
3. The sparse to thick tree plantings surrounding the plant will attenuate noise levels.

OPERATIONS

There will be unavoidable noise due to the operation of tugs, materials handling and conveying, grinding, crushing of coal, truck and rail traffic. Since the major process operations occur 24 hours per day, some level of noise will emanate from the plant continuously.

Environmental Safeguards

Noise impacts will be mitigated by the following factors:

1. Most pieces of equipment (with the exception of parts of the kiln as required for heat dissipation) will be enclosed within buildings.
2. The design contractor will perform a detailed noise study in order to determine appropriate measures and requirements for its equipment suppliers in relation to enclosures, barriers, and machinery arrangement.
3. The continued presence of sparse to thick plantings of trees along the plant's northern and eastern boundaries will attenuate noise levels.
4. An access road will be located along the western boundary away from residential areas.
5. The 20-meter (65-foot) high limestone active and dead storage piles will be located along the eastern edge of the facility.

Mitigating Measures

One mitigating measure would be installing noise suppression equipment on baghouse fans which meet manufacturer's specified sound power levels. In addition, all process components and/or the entire facility could be completely enclosed. The cost of either of these actions is somewhat questionable in relationship to the potential benefits. The No. 2 safeguard mentioned above might be expanded to address this issue. However, a complete enclosure of the plant's facilities is probably impractical.

SOLID WASTE

CONSTRUCTION AND OPERATION

The construction and operation of the plant will result in the generation of debris, metal scraps, used refractory bricks, trees from clearing, and other forms of solid wastes.

Environmental Safeguards

Most of the wastes will be taken to the Irvington Landfill for proper disposal. The land-clearing wastes will probably be burned on site (see discussion in the Air Quality section), chipped for mulch, and/or taken to the Irvington Landfill. It is anticipated that the dredged material will be disposed at one of the approved spoil sites used by the U.S. Army Corps of Engineers for their ship channel project. The remaining wastes (metal scraps and waste oils) will be recycled, if possible.

Mitigating Measures

Mitigating measures, in addition to the proposed action, are limited due to the low level impacts of the final disposal techniques. The discussion of alternatives in Appendix E addresses other disposal methods that could be used instead of those planned.

ARCHAEOLOGY

In mid-1977, an on-site "walk-over" archaeological-historical survey was conducted on the cement plant site. No archaeological or historical sites were recorded. The Alabama Historical Commission has sent a letter of approval which stated that the cement plant site "will have no adverse effect on any cultural resources included in or eligible for the National Register of Historic Places" (see Permit and Approval section of the Summary Document).

WATER RESOURCES AND GEOTECHNICAL

CONSTRUCTION

Adverse impacts of plant construction include stormwater runoff and erosion, effects of railroad trestle and access road construction, effects of dock construction and possible oil spills.

Environmental Safeguards

During site construction, the following methods of erosion and sediment control will be implemented:

1. Storm water will be directed to the general stormwater catchment area north of the plant site and to the main wastewater settling basin. The catchment area will discharge its overflow directly to the freshwater marsh, and the settling basin will discharge its effluent to the ship channel.
2. Major access roadways will be temporarily surfaced.
3. In order to lessen the adverse impacts of railroad trestle and access road construction, berms and artificial barriers will be constructed to detain and slow down stormwater runoff.
4. Some vegetative wastes will be chipped for use as mulch to reduce erosion and to assist with the revegetation of disturbed areas.

It is anticipated that the dredging of the docking area will be conducted at the same time the U.S. Army Corps of Engineers conducts their dredge operations for the ship channel project. The dredged material probably will be disposed at one of the approved U.S. Army Corps of Engineers disposal areas. Thus, there should not be separate adverse impacts of dredging and material disposal. The potential impacts of oil spills will be minimized by the construction of berms around the temporary diesel oil storage tank and the refueling area.

Mitigating Measures

To mitigate further adverse water quality impacts of plant construction, the following measures could be taken:

1. Slopes could be graded in order to reduce the velocity of runoff. However, due to the relatively flat terrain, slopes are already expected to be minimal.
2. Temporary stabilization could be performed with nettings and chemical binders.
3. Natural buffers (such as a strip of natural vegetation) and installed buffers (such as contour strips and sod inlet filters) could be used for sediment control.
4. Artificial structures (such as gravel inlet filters, sediment traps, sediment basins, dikes, ditches, and terraces) could be used for sediment control.

Most of these measures are feasible; however, because of the planned safeguards, they are not considered necessary but should be considered at various stages of construction.

OPERATIONS

The adverse water quality impacts associated with plant operation relate to stockpile runoff, cooling water blowdown, stormwater runoff, truck and area washings, and possible materials spills.

Environmental Safeguards

Adverse impacts due to stockpile runoff will be avoided by enclosing all raw materials except the limestone and wet clay. The runoff from these piles will be collected and transported to a settling basin. The process cooling water blowdown, stormwater from the oil tank containment berm, truck/car wash, and various area washes will also be drained into the settling basin. In order to promote settling of particulate materials, the wastewater will be detained in the basin prior to being discharged into the ship channel. The settling basin has a capacity of 16 million liters (4.2 million gallons). Based on the average detention time of about 17 days, the effluent from the basin will meet the limitations of EPA and the Alabama Water Improvement Commission (AWIC).

In order to avoid water quality problems associated with general stormwater runoff, the runoff from areas of the plant site other than material storage piles and oil tank will be directed to a catchment area for settling of suspended solids and adequate detention time prior to discharging into the marsh area.

The aboveground fuel oil tank will have a containment berm which will hold the capacity of the tank. All other tanks will be below ground.

Mitigating Measures

A possible mitigating measure is the chemical treatment of wastewaters in the catchment area and the settling basin. Such action could provide better solids removal prior to discharge; however, the need for such treatment is questionable since the discharges should meet all applicable standards.

ECOLOGY

CONSTRUCTION

Adverse ecological impacts associated with plant construction include effects of land clearing and grading and effects of access road and railroad spur construction. The main impact of these activities involves destruction of wildlife habitat and loss of plant communities.

Environmental Safeguards

Normal precautions will be taken so that intrusion into the marshlands is minimized during clearing operations. Encroachment into wetland areas is limited to the access roadway corridor. These precautions will be especially beneficial to the eastern half of the site where the plant is adjacent to the edge of the brackish marsh.

The construction of the access road and railroad spur will be accomplished with minimal loss or damage to the marsh area by locating the proposed roadway and bridge as close as possible to the existing Airco road and culvert and thus allowing natural/existing flows to continue. In addition, the cattail marsh will filter the road drainage. The cattail marsh is separated from the tidal marsh by higher ground and prevents direct water flow.

Dredging and pile driving will be required to construct the docking facility. In order to lessen the impacts, it is anticipated that the dredging will be done at the same time that the dredging for the ship channel project is being conducted by the plant site. This scheduling should cause less impact than having the area disturbed during two separate time periods.

Mitigating Measures

There are no significant mitigating actions in addition to the general rule of minimizing intrusions into undeveloped areas and attempting to maximize the wildlife habitat that will remain after construction.

Alternative access routes are discussed in Appendix E, Alternatives.

OPERATIONS

Adverse ecological impacts resulting from plant operation include noise disturbance of wildlife, effects of vessel movements, stormwater and wastewater discharges, and possible oil spills. Possible mitigating actions are limited, but the following measures will be implemented to offer some ecological protection.

Environmental Safeguards

Noise Disturbance

To preserve wildlife habitat, as well as to act as a noise buffer, the greenbelt on the eastern edge of the property will be maintained. Forest vegetation in this area will insure some cover continuity for small mammals and songbirds along the eastern property boundary.

Waterway Traffic

Bow and prop wash will increase due to ship channel construction and use. As an environmental safeguard, Ideal Basic Industries will install rock riprap or sheet piles to stabilize unvegetated portions of the riverbank. Rock riprap would extend to the edge of the existing shoulder. In addition to reducing erosion and sediment stirring, riprap will provide excellent substrate for invertebrate development.

Oil Spills

Possible ecological impacts resulting from oil spills will be mitigated by the following factors:

1. The fuel storage tank will be surrounded by a berm capable of holding at least 100 percent of the volume of the tank.
2. The entire plant site will be designed to drain into a stormwater retention area, so that there would be a second chance for containment in the event that the berm were ineffective.

Mitigating Measures

The preceding sections of this appendix present other possible mitigating actions to lessen the air, noise, and water impacts. There are no additional mitigating measures specific to terrestrial or aquatic impacts.

SOCIOECONOMICS

CONSTRUCTION

Safeguards

Importation of construction workers for large projects can result in various social impacts. However, this class of impacts will be largely prevented by Ideal's policy of recruiting construction workers locally, rather than utilizing an imported labor force. The feasibility of this policy has been demonstrated by the past success of Ideal's engineering contractor (Brown & Root, Inc.) in drawing upon local labor for other construction projects of similar scale in the Mobile area. Other safeguards relating to socioeconomic impact will be the noise and air controls which will minimize effects of construction activity on land value and amenity.

OPERATIONS

The most prominent socioeconomic impacts of permanent operations at the plant site are the positive effects involving employment and income. The classes of negative impact that theoretically might be addressed by mitigative measures are: (1) traffic generation; (2) land value and amenity effects; and (3) labor force effects (including effects on community facilities). Since Ideal Basic Industries employees will make little contribution to highway congestion, and since most of the raw materials will arrive at the plant site by water or rail, only the truck trips for delivery of finished cement are capable of producing significant traffic impacts. The impacts of truck traffic will be reduced because of the relief provided by future highway improvements.

Safeguards

Land Value and Amenity

The plant facility will be designed so that a 90-meter (300-foot) wooded buffer strip is left along the eastern margin of the Ideal Basic Industries property and that two 20-meter (65-foot) high limestone storage piles separate the plant facilities and this greenbelt. These design features should reduce noise levels from the plant and create an acceptable natural appearance along Dauphin Island Parkway. Other environmental safeguards are discussed in the Noise and Air Quality sections.

Labor Force

A highly significant action which will minimize labor force impacts is the planned transfer of workers from the existing Ideal Basic Industries plant in Mobile to the new facility at Theodore. This step will require the use of contract labor at the Mobile plant during the start-up at Theodore and perhaps for an extended period thereafter. The worker transfer will mean that the opening of the Theodore plant will bring few, if any, newcomers to the Mobile area. Many of the workers transferred to Theodore eventually will move to south Mobile County, but this transition will occur gradually so that there will be no sudden stress on community facilities such as schools and housing.

Mitigating Measures

The temporary traffic impacts associated with cement deliveries by truck theoretically could be mitigated by scheduling shipments to avoid peak-hour traffic flows on Rangeline Road and Island Road. (Similarly, traffic impacts during construction could be minimized by carefully scheduling construction shifts.)

QUARRY SITE

AIR QUALITY

CONSTRUCTION

As at the plant site, construction activities at the quarry site will include land clearing, grading, roadway construction, excavating, and other heavy machinery operations. Air quality impacts will involve primarily particulate matter levels in the local area.

Environmental Safeguards

Because of the similarities in activities and impacts at the plant and quarry sites, mitigating measures to alleviate potential impacts will be similar. However, the soils and rock strata at the Gaillard properties contain much more moisture than at the Theodore site. Therefore, the watering of the excavation and grading area need not be scheduled as frequently. Equipment will be available to wet the area as needed.

Burning of some wastes will require a state permit. To minimize air pollution and forest fire problems, the material will be burned in an air-blower type pit burner. A continuous fire watch will be observed, and burning will be conducted only under favorable pollutant dispersion conditions. If air stagnation conditions develop, the fire will be extinguished. Chipping of some of the trees and brush for mulch will reduce the amount of wastes to be burned.

As discussed in the project description, the access road will be surfaced, which should further reduce the amount of fugitive dust generated by employee traffic.

Mitigating Measures

Chemical stabilizers and wind breaks could be used to decrease fugitive dust emissions (see the air quality discussion in the plant site construction section). However, these measures might not be cost-effective since the effects of water sprays and normal moisture content are expected to be satisfactory.

OPERATIONS

The only adverse impact associated with quarry operations is the emission of fugitive dust.

Environmental Safeguards

During operations, fugitive dust impacts on the local area will be lessened by the use of water sprays in the following areas on an as-needed basis:

1. Limestone breakers
2. Conveyor belt transfer points and drop points
3. Limestone storage pile
4. Barge loading points
5. Quarry areas and roadways (water sprayed from a tank truck).

In addition, the use of "boot" type loaders at the barge loading facility and the inherent moisture content of the wet limestone will suppress dust emissions.

Mitigating Measures

A possible mitigating measure would be the use of chemical stabilizers in certain areas of the quarry, such as in inactive but unvegetated portions. The overburden storage and partially reclaimed areas could be treated to provide more effective control of fugitive dust.

NOISE

CONSTRUCTION AND OPERATIONS

The noise levels projected are of low magnitude and significance. The noise will come from construction activities of land clearing and grading, dock construction and erection of facilities, and the general operational activities of removing, crushing, and transporting the limestone.

Environmental Safeguards

Noise impacts will be mitigated by the use of noise suppression equipment which complies with the Walsh-Healy Act and OSHA regulations. In addition, the surrounding elevation differences and the forests will attenuate some of the noise.

Mitigating Measures

There are no feasible mitigating measures which would reduce noise levels at the quarry site.

SOLID WASTE

CONSTRUCTION AND OPERATIONS

The construction and operation phases of the quarry will generate wastes, such as vegetation, metal scraps, waste oil, lumber, sediment, office papers, and lunchroom trash.

Environmental Safeguards

The trees and other vegetative wastes will be burned on-site (see Air Quality section) or will be chipped for mulch, depending on the size of the wastes. The majority of the metal scraps and oily wastes will be recycled. The sediment wastes from the clarification ponds will be used as reclamation material. The remaining wastes will be taken to the Monroe County Landfill.

Mitigating Measures

The mitigating actions, in addition to the above safeguards, are limited because the safeguards are proper disposal techniques with low environmental impacts (for alternatives to these proposed actions, see Appendix E).

ARCHAEOLOGY

A preliminary survey conducted in July, 1977, revealed 8 archaeological and 7 historical sites on the quarry property. Of the 15 sites, only two (Sites 6 and 8) contained some artifacts of interest and were recommended to be further investigated. However, only Site No. 6 would be impacted, since it is situated in a proposed quarry area.

ENVIRONMENTAL SAFEGUARDS

To more clearly define the value of Site No. 6 and to salvage its contents prior to quarrying, an extensive archaeological investigation was authorized by Ideal Basic Industries.

During October, 1977, archaeological test excavations of Site No. 6 were conducted by the University of South Alabama. A total of ten 2 x 2 meter test squares of arbitrary depth were investigated. Artifacts retrieved were sent to the University of South Alabama Archaeology Laboratory for cleaning, cataloging, and analysis.

A final report on the findings of the excavations was completed in March, 1978. A copy was sent to the Alabama Historical Commission, office of the state preservation officer, in accordance with their instructions of August 29, 1977, and a request for approval of quarry operations was also submitted. A complete description of the findings is included in the Archaeology section of Appendix B, Baseline.

MITIGATING MEASURES

No additional action is considered necessary.

WATER RESOURCES AND GEOTECHNICAL

CONSTRUCTION AND OPERATION

Adverse water resource and geotechnical impacts during the quarry construction phase can result from land clearing and grading, roadway construction, and stockpile construction. Adverse impacts during the operations phase can be associated with stormwater runoff, the barge loading terminal, and land reclamation.

Environmental Safeguards

Drainage/Erosion

The drainage plan for the quarry has been designed for the efficient operation of the quarry and the adequate control of erosion and sedimentation so that discharges from the site will comply with the effluent limitations for suspended solids. The major sources of sediment will be cleared areas, overburden stockpiles, active quarry areas, roadways, and areas being reclaimed.

Quarry operation will reduce erosion and sedimentation by minimizing the total amount of cleared and disturbed areas which are exposed at any given time. It will also reduce the total length of time these areas are subjected to rainfall without some protective vegetative cover or mulch. The location of permanent roads and mining haul roads will be planned to minimize disturbance or modification of drainage patterns.

During quarry construction, the clarification basins will be constructed as soon as possible and drainage routed to them to prevent direct runoff into the Alabama River or into on-site streams. Prior construction of the basins, berms, and small temporary holding ponds will be utilized wherever practical. Chipped vegetative wastes will be used as mulch to prevent erosion and reestablish vegetation in areas not to be mined for at least several years.

During quarry operation, several environmental safeguards will mitigate adverse water quality impacts. First, the quarry plan calls for the use of clarification basins to hold runoff so that suspended materials will settle out. These basins will serve all areas disrupted by active quarrying and overburden storage. The basins, which will be designed to contain runoff from a 10-year, 24-hour storm, represent the primary method of sediment control during quarry operation.

To assure that the effluent from these basins meets applicable standards for pH and suspended solids, the discharge water will be monitored regularly. To maintain the retention volume, sediment trapped in the basins will be removed periodically.

In order to minimize adverse impacts related to reclamation of mined areas, contour terracing of restructured overburden will be used to encourage infiltration, decrease surface-flow velocities, and decrease slope lengths. The overburden will be replaced to try to reestablish the natural groundwater flow patterns.

Mitigating Measures

The mitigating measures which could be employed involve the greater use of erosion control devices, such as mulching, seeding, netting, berms, localized ponding, and vegetated buffer strips. The planned safeguards appear to be adequate to prevent significant sedimentation in the Alabama River and adjacent creeks; the additional actions suggested are to further prevent erosion.

ECOLOGY

CONSTRUCTION AND OPERATIONS

Adverse ecological impacts associated with quarry construction and operations include effects of land clearing, suspended material loadings, sediment deposition, noise disturbance, base flow reduction, and limestone dust.

Environmental Safeguards

The adverse ecological impacts will be mitigated to some degree by the control measures mentioned in the previous sections on air, noise, solid waste, water, and geotechnical. In summary, these are dust suppression water sprays; noise suppression equipment; disposal of solid waste by chipping some vegetative wastes for mulch, pit-burning, landfilling, and recycling; erosion controls (contour terracing and berming) and clarification basins; and reclamation of soils to maintain natural groundwater flows. In addition, a 30-meter (100-foot) setback from major streams and a revegetation program to return the quarry to pastureland have been planned. Livestock use of newly reclaimed areas will be controlled.

Mitigating Measures

The major mitigating action not already discussed in a previous section is a revegetation program to develop healthy biologic communities as a wildlife asset along the edges of the mined areas. These "blend" zones would become ecotones between biotic communities and would be managed to produce more varied assemblages of plants and animals than would be possible for either community alone. A variety of wildlife food and cover plants are available from public sources. Other species which would naturally volunteer and produce significant browse would include woody species such as maples, persimmon, sassafras, and oak, and herbaceous natural plants such as beggar ticks, vetch, lespedeza, and sumac.

Since the reclaimed land will be utilized as pasture, the area for which beneficial wildlife plantings will be feasible is rather small, consisting of: (1) blend zones between mined and unmined land; (2) potentially difficult areas such as drainageways where erosion may occur; and (3) other areas requiring stabilization, such as the faces of retention dams. This option is currently under consideration by Ideal Basic Industries and may be included in the quarry reclamation activities.

SOCIOECONOMICS

No environmental safeguards have been identified for the quarry site since no adverse socioeconomic impacts are associated with quarry construction or operations.

APPENDIX E. ALTERNATIVES

INTRODUCTION

This appendix contains a discussion of alternatives to the proposed action. The distinction between an alternative and a mitigating measure (see Appendix D) is that the former is a replacement for the action causing the impact, whereas the latter is a measure to be taken along with the proposed action to lessen its impact. Economic and environmental factors have been considered in the selection of alternatives for evaluation, and emphasis has been placed on alternatives with significant implications for environmental impact.

The actions presented are considered to be the most practical alternatives to the proposed action. Actions which may be physically feasible, but not practical to accomplish, are not described in this appendix.

The alternative actions for each project are presented in the following categories:

1. No action (no project),
2. Site location,
3. Process or resources, and
4. Abatement measures.

The site location section discusses the various geographical areas analyzed by Ideal Basic Industries. Each site was rated on a series of criteria for overall suitability as a quarry or cement plant.

The no-action section assesses the environmental aspects of the properties in 1992, if the quarry and the cement plant are not constructed. A more complete discussion of each discipline area (air, water, noise, etc.) is given in the appropriate sections of Appendix B, Baseline.

In the process/resources section, other operating processes, equipment arrangements, raw materials, and energy sources are discussed.

The sections on abatement measures review other actions that could be taken to reduce the projected environmental impacts discussed in Appendix C, Impacts. Due to the low level (magnitude and significance) of the majority of the adverse impacts, the use of alternative actions are typically not warranted on a cost-to-benefit basis.

The majority of alternatives for the proposed project, other than the no-action alternative, involve either site selection or project activities affecting the environmental parameters of air, water, solid waste, and noise. The rejected alternatives had excessive environmental impacts, were too costly, or were relatively inefficient. In the case of site alternatives, numerous factors have been responsible for the ultimate selection of the Theodore and Monroe County locations.

PLANT SITE ALTERNATIVES

NO-ACTION ALTERNATIVE

The present discussion considers the environmental and social conditions which would prevail in 1992 without the proposed Ideal Basic Industries cement plant at Theodore.

FUTURE LAND USE

Projected land use in the vicinity of the Ideal Basic Industries property is presented in Figure E.1. The area west of the proposed site and south of Island Road is projected to be industrial land in 1992. Industrial use is also projected for most of the ship channel frontage east of the turning basin and for a portion of the Mobile Bay waterfront just north of the Alabama State Docks terminal facility. Some commercial and residential development is expected on the north side of Island Road near the intersection with Rangeline Road.

The Ideal Basic Industries property is valuable for a variety of industrial purposes and could probably be sold for alternative industrial use if the cement plant were not built. Therefore, it is assumed that there would be some other form of industrial development at the site by 1992.

AIR QUALITY

A projection of baseline air quality levels 15 years into the future requires assumptions about both future industrial growth and fuel availability. The Theodore Industrial Park area is expected to continue development, so that by 1992 manufacturing employment in this area will be two to four times its present level. Problems of fuel availability might force some existing industries to use fuels with high sulfur content, and thus sulfur dioxide emissions could be increased. However,

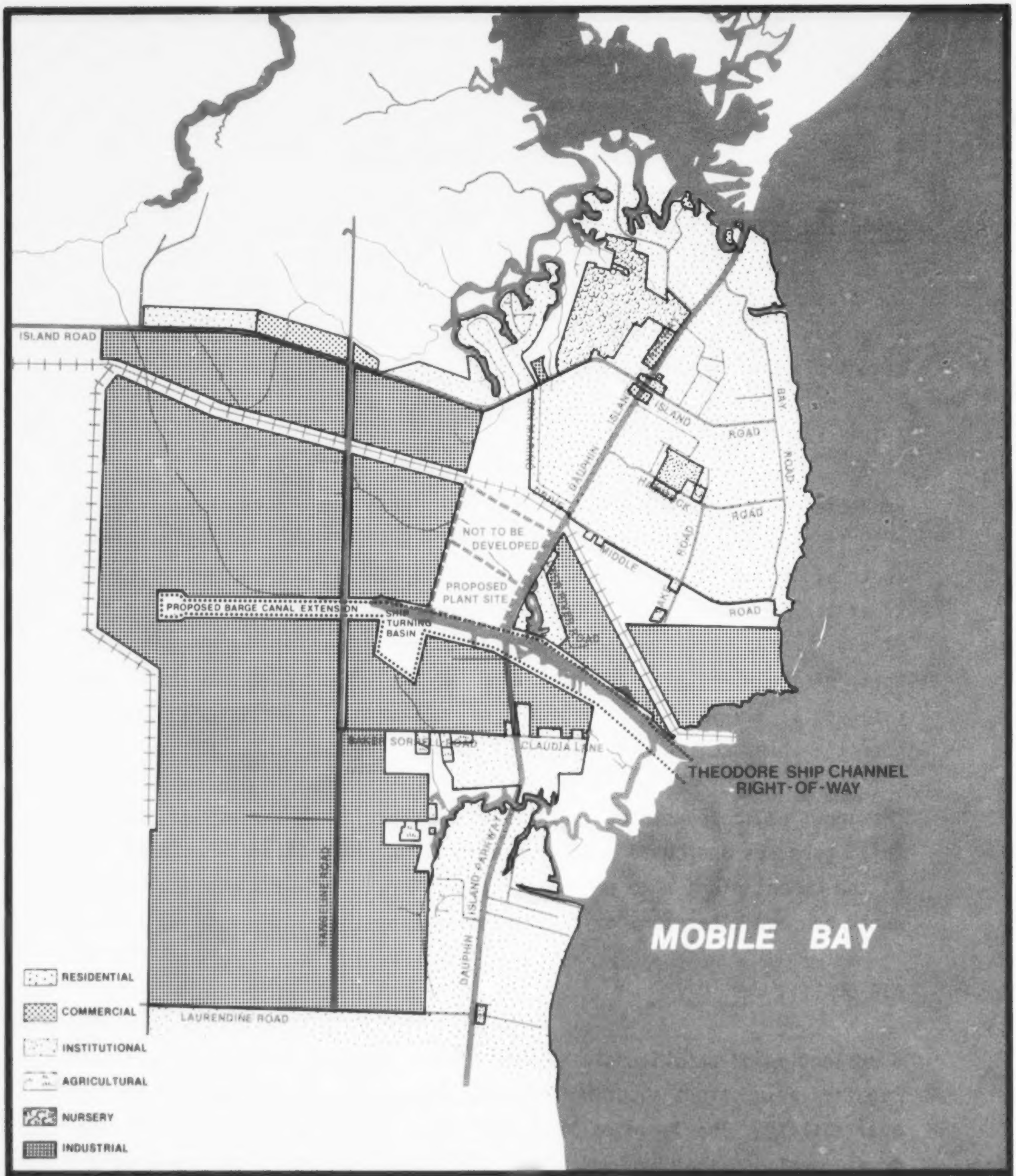

ISLAND ROAD
PROPOSED BARGE CANAL EXTENSION
SHIP TURNING BASIN
NOT TO BE DEVELOPED
PROPOSED PLANT SITE
DAUPHIN ISLAND ROAD
ISLAND ROAD
BAY ROAD
HAMMOCK ROAD
MIDDLE ROAD
LAKE ROAD
SORRELL ROAD
CLAUDIA LANE
THEODORE SHIP CHANNEL RIGHT-OF-WAY
MOBILE BAY
DAUPHIN ISLAND PARKWAY
RANGELINE ROAD
LAURENDINE ROAD
RESIDENTIAL
COMMERCIAL
INSTITUTIONAL
AGRICULTURAL
NURSERY
INDUSTRIAL
0 0.5 1
SCALE IN KILOMETERS

Figure E.1
PROJECTED LAND USE IN THE VICINITY OF THE PROPOSED IDEAL BASIC INDUSTRIES PLANT SITE, 1992

SOURCE: Environmental Science and Engineering, Inc., 1977.

**REGION IV
U.S. ENVIRONMENTAL PROTECTION AGENCY ENVIRONMENTAL IMPACT STATEMENT FOR IDEAL BASIC INDUSTRIES**

**PROPOSED CEMENT MANUFACTURING PLANT THEODORE INDUSTRIAL PARK
MOBILE, ALABAMA**

air quality modeling studies have indicated that, even though ambient concentrations of atmospheric pollutants generally will increase over the next 15 years, air quality standards and allowable increments will not place serious constraints upon future industrial growth near Theodore. The factors responsible are the high degree of air emission control that could be applied, the relatively low spatial density of industrial development, and the prevailing atmospheric dispersion patterns.

NOISE

Noise levels are expected to increase due to: (1) traffic on the Theodore Ship Channel; (2) increased highway traffic; and (3) increased noise contributions from industrial activity. The quantitative noise projections do not cover new industrial sources, or traffic increases on secondary roads.

The environmental impact statement for the ship channel project included forecasts of noise levels at various points along the ship channel (USC Incorporated, Consulting Engineers, 1974). The highest projected noise levels were obtained for stations located on both sides of the channel from the Dauphin Island Parkway to the turning basin.

The baseline estimates obtained in the present study apply to different stations and are expressed as L_{dn} and $L_{eq(24)}$. These projections are presented in Table E.1, along with the sound levels suggested by EPA as requisite to protect public health and welfare. The suggested outdoor levels are 70 dBA for industrial land use which could cause hearing loss over the long term (40 years) and 55 dBA for residential and institutional land use which could interfere with communication.

Noise levels are expected to increase appreciably at all but two of the stations between 1977 and 1992 (see Appendix B, Baseline, for the locations of these stations). At stations 6 and 12, the noise levels are

Table E.1. Ldn and Leq(24) Noise Levels (dBA) at Baseline Monitoring Stations in 1977 and in 1992 (exclusive of any new industries)

Station	1977		1992	
	L_{dn}*	$L_{eq(24)}$*	L_{dn}*	$L_{eq(24)}$*
1	55	48/70	60	55/70
2	54	49/70	60	54/70
3	48	45/70	48	45/70
4	72	66/70	81	75/70
5	48/55	45	48/55	45
6	65	61/55	71	68/55
7	55	53/55	55	53/55
8	55/55	48	64	57/70
9	53/55	51	63	56/70
10	54/55	52	63	56/70
11	67	59/70	†	†
12	67/55	66	72/55	61

* Second numbers in the columns refer to sound levels requisite to protect public health and welfare according to the land use (see Table B.N.2).

† No estimate since site is in future turning basin.

Source: Environmental Science and Engineering, Inc., 1977.

already higher than the recommended values due to existing vehicular traffic along Island Road (Hamilton Boulevard) and its intersection with Dauphin Island Parkway. At station 4 (located on Rangeline Road), the recommended level will be exceeded by 1992. In the case of stations 8, 9, and 10 (located along the south side of the ship channel), recommended noise levels will not be exceeded only because land at these stations is expected to convert from residential to industrial use, and thus the recommended maximum levels will be raised. The conclusion from these projections is that there would be moderate, but not severe, noise levels in the vicinity of the Ideal Basic Industries property if the proposed cement plant were not constructed. Again, this conclusion does not consider the impacts of alternative industrial development at the Ideal site.

WATER RESOURCES AND AQUATIC ECOLOGY

Water resources in the vicinity of the Ideal Basic Industries property will undergo major changes by 1992 as a result of the ship channel construction project, which will include a bay channel, a land cut, and a turning basin of 12-meter (40-foot) depth. A barge canal extension of 3.7-meter (12-foot) depth will extend further inland.

The existing barge canal (Middle Fork Deer River) has poor flushing characteristics, and this situation will probably prevail for the enlarged ship channel. Thus, wastewater effluents might not be removed effectively, with the result that water quality could be degraded below existing levels. This prospect would become increasingly likely as industrial development and maritime activity expand in the ship channel corridor. However, a critical factor for water quality in the ship channel would be the construction of the proposed common wastewater outfall, which could serve existing and future industries, and possibly carry municipal effluents as well. This project is currently undergoing the EIS review process for COE approval of construction permits.

The North Fork Deer River, which crosses the Ideal Basic Industries property, could degrade significantly in the future due to effluents coming onto the property from the west. This aquatic system is poorly flushed, but subject to natural cleansing action by marsh vegetation. The most likely condition in 1992 would be moderate water quality degradation.

TERRESTRIAL ECOLOGY

The vegetation on the proposed site has been affected by recent logging activity and thus represents a very early seral stage of a southern mixed deciduous forest. If there were no development of the property, the area would evolve as a pine forest in approximately 80 years and as a mixed deciduous forest in 140 to 170 years. The major influence upon terrestrial fauna over the next 15 years will be the gradual reduction of disclimax shrub and understory areas. The density of birds and mammals may decline during this mid-successional period, although some species can be expected to increase (e.g., squirrels). The changes in mammal populations will generally be quantitative rather than qualitative, since most of the later seral stages of mammals are already present.

The marsh is a relatively stable system which would remain largely unchanged in the absence of development on the plant property. There would be continued buildup of organic material at the land surface, which would cause marsh and bog areas to become somewhat smaller over time, but the basic structure and function of the marsh should not change in the next 15 years under the conditions assumed.

SOCIOECONOMIC CONDITIONS

Future socioeconomic conditions in south Mobile County have been discussed in some detail in Appendix B, Baseline. In summary, the population of south Mobile County is expected to increase from 47,400 in 1977 to 65,400 in 1992. There will be an increase in resident employment from 17,310 workers to 25,500 workers over this period, and the total number of dwelling units will increase by more than 50 percent, from 15,080 in 1977 to 22,800 in 1992. This population growth will require substantial expansion and/or upgrading of public facilities, notably schools, highways, and water and sewer facilities.

Most of the land along the ship channel and the adjacent Mobile Bay shoreline is expected to convert to industrial use.

SITE LOCATION

INTRODUCTION

The selection of the Barrett site at Theodore as the location of the proposed Ideal Basic Industries cement plant has been the culmination of a 5-year planning process. The following discussion summarizes the steps whereby the Theodore site was identified (by Ideal Basic Industries) as the most favorable alternative. Although not performed specifically for this EIS, the site selection study demonstrates that the selection of the proposed plant location is environmentally sound as well as economically feasible.

The driving force behind the cement plant location studies has been the observation that strong demand exists for new cement manufacturing capacity to serve an established market within the immediate coastal confines of Florida, Alabama, Louisiana, and Mississippi. The existing customers of the Ideal Basic Industries plant and terminal facilities at Baton Rouge, New Orleans, Lake Charles, Mobile, and Tampa would become the clientele of a new manufacturing operation. The company has concluded not only that the Gulf Coast market currently is large enough to support a major increase in capacity, but that this geographic area has all of the elements necessary for future growth. Three distinct options considered in the planning studies have been: (1) modernization and expansion of the Ideal Basic Industries existing plants; (2) multiple new plant locations; and (3) consolidated productive capacity at a single new location. These are described in the sub-sections which follow.

MODERNIZED AND EXPANDED FACILITIES AT EXISTING PLANTS

Because cement manufacturing is an extremely capital-intensive process, early consideration was given to the feasibility of modernizing and expanding existing Ideal plants which might supply the Gulf Coast market. Table E.2 summarizes the suitability of these sites for expanded capacity.

Table E.2 Profile of Ideal Plants Serving Southern Markets in 1974: Expansion Possibilities

Plant Characteristics	PLANT LOCATIONS ADA	OKAY	MOBILE	BATON ROUGE
1974 Cement Eq. Production: Metric Tons (Tons)	560,000 (620,000)	327,000 (360,200)	408,000 (450,000)	381,000 (420,000)
Kiln Data (No. & Age)	2 (1958)	2 (1929 & 1947)	5 (1943)	5 (1943)
Process Employed	Wet	Wet	Wet	Wet
Fuel Consumption per Million Calories/Bbl. (Million Btu's/Bbl.)	0.30 (1.2)	0.38 (1.5)	0.40 (1.6)	0.43 (1.7)
Primary Fuel	Natural Gas	Natural Gas	Gas, No. 6 Fuel Oil	Gas, Fuel Oil System Being Installed
Standby Fuel	None; Coal System Possible in Long Range Future	None; Coal System in Preliminary Planning Stage	None	None
Present Fuel Source	Boettcher Oil & Gas Oklahoma Nat. Gas	LNT	Gas (One-third supply) United Gas Pipeline Fuel Oil (two thirds of supply)	Monterey Gas Co. (1-year contract)
High Lime Source	Limestone	Limestone	Oyster Shells	Oyster Shells
Suitability of Present Site as a Location for an Additional 3 Million Barrels of Capacity	New installation could be included with present plant	New installation could be built on an adjacent site but not on present property.	Not feasible without demolition of existing facilities. Demolition costs and loss of revenue and market share during construction make these sites infeasible for new capacity	

Source: Ideal Basic Industries, 1974.

Engineering investigations carried out in late 1972 and early 1973 concluded that the Ada and Okay plants could accommodate substantial additional production. However, this new capacity would be significantly removed from the coastal market to be supplied. Therefore, the delivered price of cement in the marketplace would be governed by whatever rail rates the company might be able to negotiate. Also, any capital cost savings accruing to expanded capacity at either of these locations would be offset, to a degree, by the costs of operating terminal-transfer facilities in the Gulf Coast market area.

Neither the Mobile nor the Baton Rouge facility could accommodate expanded production without demolition of existing plants. The demolition cost, plus the loss of revenues to Ideal Basic Industries during demolition and reconstruction, would render both of these alternatives highly infeasible. This approach would also reduce the company's cement production for several years and would thereby make the market very vulnerable to other sources of cement. Finally, the Mobile site has limited acreage, and additional land is not available.

From these early investigations, it was concluded that Ideal's future in the Gulf Coast would best be served from one or more entirely new plant sites.

MULTIPLE NEW PLANT LOCATIONS

A detailed analysis compared the capital and operating costs of a single large plant of 1.4 million metric tons (1.5 million tons) per year vs. two smaller plants of 0.7 million metric tons (0.75 million tons) each.

Of the many two-plant alternatives considered, construction of new facilities near the existing Baton Rouge and Mobile plants was the most favorable. Even in this most favorable two-plant case, capital costs would be 60 percent higher than for a single large plant centrally located on the Gulf Coast. Operating costs would also be substantially higher because of a larger total labor force in two separate facilities. Considering annual capital costs, as well as operating, distribution, and marketing costs, the study concluded that total costs per unit capacity would be 25 percent less for the single larger facility. Further planning efforts were therefore directed towards selection of an entirely new plant location.

CONSOLIDATED PRODUCTIVE CAPACITY AT A SINGLE NEW LOCATION

Evaluation Criteria

A large number of potential plant sites were evaluated by a rather elaborate series of procedures and criteria. Eleven well-defined criteria were applied in the screening process, including six "first level" criteria and five "second level" criteria. As indicated below, the first-level criteria related primarily to the economic feasibility of plant operation at a given site. However, environmental factors entered prominently in the pre-screening of sites, in the environmental compatibility criterion, and in the final evaluation process.

Brief descriptions of the criteria are presented in the following listing:

FIRST-LEVEL CRITERIA

1. Site availability.
2. Physical suitability and engineering feasibility. Relates to the existence of sufficient acreage to accommodate an efficient plant layout; the dimensions of waterfront areas; the existence of soils with high load-bearing capability; and the availability of power, gas, water and sewer services, skilled labor, and equipment repair services.
3. Access to deep water transportation. Relates to the critical importance of transportation cost in determining Ideal's ability to serve a geographically dispersed market, plus the influence of transportation upon input costs. The potential advantages of

water transportation relative to land transportation vary with the depth of water available. Deep draft, ocean-going vessels are the most economical.

4. Location with respect to expected markets. Refers to the advantages of central location within the market area discussed previously.
5. Location with respect to raw material supply sources.
6. Capital and operating cost economics. Refers to geographical variations in the costs of plant construction, fuels, electric power, local taxes, labor and similar factors, plus the degree of operating flexibility and project risk.

SECOND-LEVEL CRITERIA

7. Highway, rail, and other supporting facilities.
8. Environmental compatibility. Defined in terms of probable acceptance of the project by responsible local officials and by citizens. Determined by contacting state, county, and municipal agencies and by studying recent events and policies in individual communities.
9. Community resources. Refers to the existence of community services such as police and fire protection, schools, and hospitals needed by project personnel, plus the size, training, and stability of the local labor force.
10. Land use compatibility. Relates to the existing land uses found near a potential site, the most favorable being industry and the least favorable being recreational and residential land uses.
11. Natural hazards. Refers to the susceptibility of sites to wind and water damage.

Descriptive ratings, termed "site evaluators," were assigned to each site for each of the eleven criteria. A summary of the results of the first-level screening and of the reasons for the ultimate selection of the Theodore site is presented in the following pages.

Site Evaluations

A total of 27 potential sites were considered in the formal screening process. These sites were identified through an investigation and analysis of five general areas: (1) southwest Alabama; (2) the Pensacola-Panama City area of Florida; (3) the Gulfport-Pascagoula area of Mississippi; (4) the Apalachicola-Chattahoochee River area in Georgia; and (5) the Louisiana delta.

The south Alabama area was most intensively studied because it most nearly satisfied the first level site evaluators. Twelve alternative plant locations were identified and investigated with the assistance of the Industrial Development Division of the Alabama Development Office, the Industrial Development Department of the Mobile Area Chamber of Commerce, and the Industrial Development Department of Merchants National Bank of Mobile.

Site investigation in the Pensacola-Panama City area of Florida began in 1973 in consultation with state and city development agencies and power company representatives. Attention was focused on potential sites in the Pensacola area, the Port of Panama City (St. Andrews Bay), and Port St. Joe (St. Joseph Bay). These investigations determined that there were no industrial sites bordering on 12 meters (40 feet) of water and that the only sites with access to water depths of 8 to 9 meters (25 to 30 feet) were non-contiguous tracts smaller than 6 hectares (15 acres) each. The only available industrial acreage of suitable size and configuration was situated along water depths of about 3 meters (10 feet), which would limit inbound and outbound water movements to shallow draft vessels. These findings were verified in June, 1974.

Site investigations in coastal Mississippi were carried out with the assistance of the Mississippi Agricultural and Industrial Board, the Industrial Development Department of Mississippi Power Company, and the industrial development boards and port authorities of Forest, Hancock, and Jackson counties. Five potential sites were identified, including one site at the Port of Pascagoula and two each in Hancock and Harrison counties.

Because the sites studied in Georgia were geographically removed from the company's principal cement consuming markets in the Gulf Coast and because waterborne transportation would be restricted to 2.7-meter (9-foot) draft barges, the findings of these investigations were generally unfavorable.

Investigations in Louisiana, which yielded six potential sites, were conducted in consultation with the Louisiana Department of Commerce and Industry; the Industrial Development section of Louisiana Power and Light; the Industrial Development Department of the Southern Railroad; and the Baton Rouge, New Orleans, and Lake Charles chambers of commerce.

Table E.3 presents in simplified form the outcome of the first-level site screening process. The table indicates those first-level criteria for which a given site received a relatively unfavorable rating. Nineteen of the potential plant sites failed to qualify in four or more first-level criteria. Because these sites were clearly unacceptable as potential locations for the project, they were not subjected to "second-level" evaluation.

Second-Level Site Evaluations

The following eight sites survived the first-level screening:

1. Jacintoport--Owned by Louisiana Land and Exploration Company, and situated on the Mobile River approximately 8 kilometers (5 miles) north of the Mobile City limit.

2. Old Chickasaw Shipyard--Held in a union trust and located just north of Mobile on the Mobile River in Chickasaw, Alabama.

Table E.3. First-Level Site Evaluation

	FIRST-LEVEL CONSIDERATIONS					
POTENTIAL SITES	Site Availability	Physical Suitability and Eng. Feasibility	Access to Deep Water Transportation	Location with Respect to Expected Markets	Location with Respect to Raw Material Sources	Capital and Operating Cost Economics
ALABAMA						
Jacintoport (Mobile)		●				●
Old Chickasaw Shipyard		●				●
Monroe Park		●	●		●	●
Blakely Island		●		●		●
Theodore--Barrett Site						
Theodore--McWane Site	●					
Theodore--Mobile Deep Water Property		●				
Buck's Crossing			●	●	●	●
Twenty-Four Mile Bend		●	●	●	●	●
Ladd Property (21 Mile Bluff)		●	●	●	●	●
Chastang Site (River Mile 35)		●	●	●	●	●
Gaillard Property			●	●		
FLORIDA						
Port of Pensacola		●	●	●	●	●
Port of Panama City		●	●	●	●	●
Port St. Joe		●	●	●	●	●

Table E.3. First-Level Site Evaluation (Continued, Page 2 of 2)

	FIRST-LEVEL CONSIDERATIONS					
POTENTIAL SITES	Site Availability	Physical Suitability and Eng. Feasibility	Access to Deep Water Transportation	Location with Respect to Expected Markets	Location with Respect to Raw Material Sources	Capital and Operating Cost Economics
MISSISSIPPI						
Port Bienville (Hancock County)		●	●	●	●	●
Bay St. Louis (Hancock County)		●	●	●	●	●
Port of Gulfport (Harrison County)		●	●	●	●	●
Biloxi (Harrison County)		●	●	●	●	●
Pascagoula (Bayou Casotte)				●	●	●
GEORGIA						
Bainbridge			●	●	●	●
LOUISIANA						
Westport (Jacintoport, N. Orleans)		●	●	●	●	●
Lake Charles (Old Lone Star Site)				●	●	●
Braithwaite (Plaquemines Parish)		●		●	●	●
Meraux (St. Bernard Parish)		●		●	●	●
McMaster (St. Bernard Parish)		●		●	●	●
Poydrate (St. Bernard Parish)		●		●	●	●

Key: ● = An unfavorable rating.
Source: Ideal Basic Industries, Inc., 1974.

3. Mobile Deep Water Property at Theodore--Adjacent to the old ammunition depot dock on the Mobile Bay shoreline, along the route of the Theodore Ship Channel project.

4. Blakely Island--An approximately 28-hectare (69-acre) site owned by the Frisco Railroad on the western shore of Mobile Harbor, almost directly across from the Ideal Basic Industries existing Mobile cement plant.

5. Barrett Site in Theodore Park--A 71-hectare (175-acre) tract situated on the northern side of the inland portion of the Theodore Ship Channel, bounded on the east by the Dauphin Island Parkway and to the west by the Airco, Inc. operation.

6. Ideal's Gaillard Site--A 740-hectare (1,830-acre) tract on the eastern bank of the Alabama River (Marshall Bluff) in Monroe County, some 22 kilometers (14 miles) southwest of Monroeville, Alabama.

7. Port of Pascagoula--The Bayou Casotte industrial complex.

8. Lake Charles--The old Lone Star Cement plant site consisting of 154 hectares (380 acres) on the Calcasieu River in Ward 4 in Calcasieu Parish, Louisiana.

These eight potential locations were evaluated in considerable detail. Six of the sites were rejected for the following reasons:

Lake Charles (Old Lone Star Site)--Major disadvantages included: (1) remoteness of the site from potential supply sources of limestone, clay, and coal, resulting in substantial transportation diseconomies; and (2) location of the site at the western end of Ideal's Gulf Coast market.

Blakely Island--The primary disadvantages were: (1) very low elevation which would require substantial fill, soil, and site work;

(2) poor highway access to the major cement consuming markets in the Mobile area; (3) absence of a railroad, which would necessitate ferrying of railcars across Mobile Harbor via barge; (4) constraints upon process flow imposed by the physical configuration of the site; and (5) environmental constraints.

Pascagoula--The economic disadvantages of this area included the following factors: (1) the site was located several kilometers from the existing terminal facilities, so that double handling of materials and a costly conveying system would be required; (2) the utilization of port facilities at this site would involve payment of inbound and outbound charges on very substantial volumes of raw materials and finished cement products; (3) the plant would be distant from raw material supply sources; (4) location at Bayou Casotte ultimately would require the company to establish a new terminal operation in Mobile.

Jacintoport (Mobile)--Major site disadvantages to Ideal Basic Industries included: (1) a site elevation which makes much of the property flood-prone and requiring substantial fill, soils, and site work; and (2) local objections to industrial development of Jacintoport at the time of site investigations (late 1973).

Old Chickasaw Shipyard--The primary problems were: (1) the site's elevation ranged from 0 to 3 meters (0 to 10 feet) msl, making the area flood-prone; (2) it would be necessary for Ideal to use pilots and assisting tugs to navigate the Cochrane and L&N bridges; (3) the existing waterfront and dock structures do not lend themselves to the material flow of a cement manufacturing operation; and (4) the Chickasaw site might be environmentally unsuitable for cement manufacturing because of its proximity to the heavily industrialized area of Mobile.

Mobile Deep Water Properties (Theodore)--Major disadvantages of this site included: (1) low elevation and soil conditions;

(2) limited waterfront area and the physical configuration of the site; and (3) open exposure to the Bay and potential risk of plant damage in the event of hurricanes.

Site investigations and economic studies conducted from late 1973 through the middle of 1974 thus reduced the number of alternative new plant sites meeting the company's criteria to two locations: the Ideal Basic Industries Gaillard property in Monroe County and the Barrett property in the Theodore Industrial Park. The reasons for the ultimate selection of the Theodore site are outlined in the following paragraphs.

Cost Analysis

If the manufacturing operation were located at Gaillard, it would be necessary to transport virtually the entire plant output via shallow-draft barge to Mobile for transfer to deep-draft barges and other transportation modes. For purposes of analysis, the Barrett site in the Theodore Industrial Park was assumed to be the terminal/transfer point under this alternative.

The construction cost of the cement plant would favor a Gaillard location by approximately 15 percent. However, this saving would be offset by the additional capital costs associated with: (1) construction of a terminal transfer point and (2) the purchase of more costly equipment to transport finished cement on the Alabama River than would be needed to transport limestone over this route. (Open barges could transport limestone and clay, whereas closed, air-tight barges would be required to transport finished cement.) The total construction cost of a plant located at Gaillard with a terminal-transfer station at Theodore would be several million dollars greater than the construction cost of a Theodore plant.

A similar situation would apply to labor force requirements. A savings in the number of hourly and supervisory persons required for a plant at Gaillard would be more than offset by the work force necessary for a Theodore terminal operation.

In terms of operating costs, the Gaillard plant would result in a 5 percent saving per ton of output relative to the Theodore plant location. This cost saving would be attributable to a manpower reduction of 12 persons, plus an input cost reduction amounting to the cost of transporting limestone from Gaillard to Theodore. On the other hand, marketing costs would be roughly 37 percent greater at Gaillard than at Theodore. These costs include selling and administrative expense, transportation of finished cement from the plant to terminals, and terminal operating costs. With regard to transportation, it has been computed that the total cost difference in barging finished cement versus limestone, after provision for depreciation, would be approximately 3 percent in favor of barging limestone. (The difference in capital outlays for transportation equipment would amount to $2.7 million in favor of limestone.)

When both production and marketing cost differences associated with the two sites are considered, the total estimated expenses for the Gaillard plant location are approximately 3 percent more per ton than for the Theodore plant. This percentage does not represent a major economic difference between the two plant location schemes.

Analysis of Operating Conditions and Transportation

Operating flexibility and project risk were important selection factors. The remote location of a Gaillard plant site could be a complicating and costly factor from a labor standpoint, during both the construction and operation phases. Large equipment for the plant at Gaillard could possibly be delivered via the Alabama River during the plant construction period, but the Gaillard waterfront would need to be improved substantially for this purpose. Major equipment could likewise move to the site via rail or highway; however, added costs might be incurred because of the upland location of the site and the added assembly cost of equipment brought to the site in smaller sections.

Whereas the Theodore site would have ready access to rail and interstate highway connections, the Gaillard site lacks major transportation connections. Approximately 18 kilometers (11 miles) of railroad would need to be constructed to connect the plant with the Frisco mainline to the east of the site. Right-of-way acquisition through easement or purchase could be both difficult and expensive. Furthermore, a plant located at Gaillard would require an access road connecting the operation to the county road approximately 3 kilometers (2 miles) distant (assumed to be a two-lane, heavy-duty paved road as opposed to a gravel-surfaced road required for just a quarrying operation).

Although the extensive technical services a cement plant sometimes requires are readily available in the Mobile area, major equipment repairs and machine shop work for a Gaillard plant location would entail hauling major equipment to Mobile or Montgomery. This transportation problem could increase plant downtime and repair expenses. The availability of a suitable labor force in Monroe County would be uncertain, and technical and managerial employees might be unwilling to transfer to the comparatively undeveloped and remote location offered by a Gaillard plant.

In-depth studies of the navigability of the Alabama River and the problems uncovered in these investigations were very important in the company's choice of a plant site. This river is noted for its periods of high and low water, fog, and restricting bends. Location of the proposed plant at Gaillard would make the overall operation highly vulnerable to potential problems involving this waterway. A Theodore location, on the other hand, would increase Ideal's marketing flexibility due to the availability of deep water, rail access, and direct highway links to interstate highways I-10 and I-65.

Approximately one-third of the annual output of the proposed new plant potentially can be marketed in the Mobile metropolitan area. The Theodore plant location would maximize Ideal's effectiveness in reaching this market. The deep water access afforded by the Theodore Channel would permit the use of alternative raw materials and/or coal from other sources. Likewise, if the company should desire to import clinker or to export cement, these activities could be accomplished most readily and economically from the deep water Theodore site.

Assessment of Environmental Impacts

Environmental impacts associated with a Gaillard versus Theodore plant location were assessed as part of the site selection process (see Table E.4). This analysis indicates that there would be some environmental impacts at either plant location and that these impacts might be less severe on the whole at the Theodore site.

In view of these factors, plus the currently favorable prospect for timely completion of the Theodore Ship Channel, the management of Ideal Basic Industries formally recommended in May of 1977 that the proposed cement manufacturing facility be constructed at the Theodore location. During the course of performing their site review, Ideal Basic Industries has discussed the proposed project with the following local and state agencies: the City of Mobile, the Mobile County Commissioners, the Industrial Development Boards of the City of Mobile and the City of Monroeville, the Alabama Development Office, the State Industrial Development Authority, and the Alabama Commissioner of Revenue.

Table E.4. Comparative Environmental Evaluation for Location of the Proposed Plant at Theodore Versus Gaillard (Performed by Ideal Basic Industries)

Environmental Parameter	Theodore	Gaillard
Fish	A minor resource. Will be influenced little. Important to protect estuary.	A major resource. Care, control, and consideration in handling runoff and discharges would be required.
Weather	Subject to storms and coastal salt effects. High tides and hurricane floods could be problems.	A protected area. No salt problems or high tides.
Land Use	Will fit in with surroundings in Industrial Park.	Will be a major change. Only one land use of its kind in area.
Transportation	Available close by. No special environmental assessment.	Will require additional environmental assessment work for railroad. Will need additional road access work, causing disturbance.
Sanitary Wastes	Will be handled by regional wastewater system.	Will need a separate facility with treatment.

Table E.4. Comparative Environmental Evaluation for Location of the Proposed Plant at Theodore Versus Gaillard (Performed by Ideal Basic Industries) (Continued, page two of two)

Environmental Parameter	Theodore	Gaillard
Water	Subsurface--conditions known, no apparent problems. Surface--water quality control relatively easy. Discharge to industrial canal or Industrial Park wastewater system.	Subsurface--conditions not known. Surface-control will require more effort and possible expense than Theodore. Discharge to navigable stream with multi-resource usages.
Air	Ambient conditions--low quality. Classified in lower quality status.	Ambient conditions--high quality. Classified in higher quality status.
Soils	No sensitive runoff areas as long as estuary is protected.	Has sensitive runoff areas. Runoff control may be difficult due to irregular terrain.
Physiography	Flat.	Rolling and irregular.
Vegetation	Low quality.	High quality. Potential for degradation thus greater than at Theodore.

Source: Ideal Basic Industries, 1976.

PROCESS/RESOURCES

Two basic alternatives for the manufacture of portland cement are "wet" or "dry" processing. In both processes, the raw materials are mined, crushed, and blended before grinding. Ideal Basic Industries proposes to use a dry cement process with several fuel-saving options, such as a combined kiln/clinker cooler/raw mill exhaust system and a kiln suspension preheater. The possible alternatives are a wet process and the use of other types of raw resources.

WET PROCESS VERSUS DRY PROCESS

In the wet process, raw materials are mixed with water and pumped to the kiln as a slurry. In the dry process, raw materials are dried prior to feeding into the kiln. The two processes are otherwise the same.

About two-thirds of the currently operating cement plants use the wet process (Reding, et al., 1975), but many of these are old plants. Modern dry process plants are more energy efficient than wet process plants and thus are ecologically preferable.

Because the water in the slurry must be evaporated in the kiln, a wet process plant uses twice as much energy per ton of clinker as a dry process plant does. Furthermore, in the dry process, waste heat from the kiln and from the clinker cooler is used to dry the raw materials; such fuel conservation practices cannot be applied in the wet process.

An advantage of slurrying raw materials is that no dust is produced. However, in both processes dust can be generated from the clinker coolers, finish mills, and bulk handling systems. Baghouses remove at least 99 percent of this dust. A dry process plant uses additional baghouses to control dust, and the wet and dry processes do not differ significantly in the quantity of air emissions per unit of output (U.S. EPA, Office of Air Quality Planning and Standards, 1975).

There are several disadvantages of the wet process. Spills of the slurry and leaching of recycled kiln dust can cause wastewater discharges. The slurry tends to clog lines and mixing tanks and thereby creates maintenance problems. Finally, a much larger amount of exhaust gases, produced because of the steam from the water, necessitates a larger and more costly air pollution control device on the kiln exhaust.

By using waste heat to remove the moisture in the raw materials, the dry process plant becomes very economical. Fuel requirements for the dry process are estimated to be 0.78 million calories per metric ton (3 million Btu per ton) of clinker versus over 1.7 million calories per metric ton (6 million Btu per ton) of clinker for the wet process.

For reasons of fuel efficiency, ease of maintenance, lesser environmental impact, and overall lower cost, Ideal Basic Industries plans to use the dry process at the projected new cement plant.

RAW MATERIALS

Limestone comprises about 80 percent of the raw materials needed in cement manufacturing. Alternative sources of limestone are considered in the section which discusses the quarry site.

Other raw material needs include argillaceous materials, siliceous materials, ferrous materials, and other minor ingredients. Clay, shale, staurolite, bauxite, aluminum dross, pumice, and volcanic ash are all argillaceous substances which could be utilized. Ideal Basic Industries has an existing clay pit and therefore will use clay at the proposed plant. The usable reserves of clay at the existing quarry amount to approximately a 5-year supply. Therefore, other sources of argillaceous material will be necessary in the future. Of the siliceous materials, including sand, sandstone, and quartz, Ideal Basic Industries will use silica sand taken from the clay quarry.

Ferrous materials include iron ore, pyrites, mill scale, and other iron bearing materials. Iron ore will be used at the Theodore plant; however, the source of this iron ore has not yet been determined. Other possible materials for the cement manufacturing process include gypsum, anhydrite, blast furnace slag, or fly ash. The proposed cement plant will use gypsum from a currently unidentified source. The reasons for selecting the specific raw materials have involved availability, economics, and compatibility with the chemistry of raw mix.

EQUIPMENT ARRANGEMENT

The present plant design has undergone many changes in the planning process. The changes were made to allow for modification to the settling basin and the stormwater catchment area, to increase the height of the main stacks, to provide a 20-meter (65-foot) high dead storage pile to form a noise buffer, to eliminate encroachment into the brackish marsh and minimize disturbance of the freshwater marsh, to cover the piles of the drier raw materials to reduce dust emissions and stockpile runoff, and to allow for many process design changes.

The arrangement of equipment and facilities, although flexible to some degree as shown by the above changes, does not have substantive alternative arrangements other than those abatement actions to be discussed in the next section.

FUELS

Coal is the preferred energy source for the proposed facility because of energy concerns and economics. Ideal Basic Industries is planning to use bituminous coal with a 1.5 percent maximum sulfur content by weight.

The use of higher sulfur coal would involve two sets of problems:

1. Operational difficulties associated with the preheater, and
2. Increased atmospheric emissions of sulfur dioxide.

Alternative fuels which could be used include oil and natural gas. Natural gas, however, may not be readily available for industrial use in the coming years, and oil is becoming increasingly scarce and subject to rapidly escalating costs. Fuel oil will be used to ignite the coal on a pilot basis and as a stand-by fuel, but use of significant quantities is not projected.

ABATEMENT MEASURES

AIR EMISSIONS

The main construction impacts relative to air emissions are smoke from burning and fugitive dust from site development activities. Alternatives to the burning are discussed in the Solid Waste section. The activities which generate the dust emissions, although mitigated somewhat (see Appendix D, Mitigating Actions), do not have practical alternative actions.

Proposed Action. Use of Baghouses, Water Sprays, Process Design

Baghouses will be used during plant operations to reduce the emissions of dust particles from all process exhausts. These devices have collection efficiencies of greater than 99 percent and are considered Best Available Control Technology (BACT).

Dust may be generated at the raw materials unloading operations, conveyor transfer and drop points, and from the uncovered storage piles. These sources are controlled by the use of water sprays for dust suppression.

Emissions of sulfur dioxide, nitrogen oxides, and hydrocarbons normally are not controlled at cement plants. Emissions of sulfur dioxide and nitrogen oxides will be subjected to some degree of control at the proposed plant by process operating parameters. However, there is no existing technology for reducing hydrocarbon emissions from cement plants.

Exhaust gases from the kiln will be vented through the raw mill where much of the sulfur dioxide will be removed by contact with the raw materials. A further reduction should be produced when the exhaust gases are forced through the alkaline dust cake which builds up on the bag filters in the baghouse systems.

Possible alternatives to the proposed actions are the use of scrubbers, cyclones, electrostatic precipitators, and enclosing sources of fugitive dust.

The other major air quality related impacts are the use of the PSD increments for suspended particulate matter and sulfur dioxide (see Air Quality section of Appendix C, Impacts) and the effects on the ambient air quality levels in the general area. There are no alternative actions that would reduce these impacts associated with the operation of the plant.

Alternative I. Scrubbers

Wet scrubbers can reduce particulate emissions by 90 percent or more. However, they are not more efficient than baghouses, and they have a number of disadvantages. Scrubbers produce a wastewater which becomes a disposal problem and a wet waste product which is difficult to recycle. Scrubbers have high energy requirements, and there are maintenance problems due to plugging of the system. This latter problem is particularly serious at a cement plant because cement dust will harden after wetting. Therefore, scrubbers are not practical for dust control. However, scrubbers could function to reduce sulfur dioxide emissions after gases are precleaned by a baghouse or an electrostatic precipitator. Since a baghouse is expected to remove at least 75 percent of sulfur dioxide, it is doubtful that scrubbers would achieve substantial further reductions that would be cost-effective. In addition, baghouses usually demonstrate better control efficiencies and have a higher reliability factor.

Alternative II. Cyclones

Multicyclones can be utilized effectively for pretreatment along with some higher efficiency device. The cyclones will remove larger particles but not the finer dusts. Therefore, cyclones usually assist other control devices by acting as precleaners and are not used as a final control system.

Alternative III. Electrostatic Precipitators

Electrostatic precipitators are, in general, employed only on large volume exhaust gas streams (i.e., from the kiln, cooler, and raw mill) since their cost is prohibitive for smaller applications. In addition, they have several other shortcomings, including: (1) explosion potential under certain upset conditions because of the combustible gases and coal dust in the gas stream and high voltage sparks produced by the precipitator; and (2) the need for conditioning the particles for the correct range of resistivity prior to entry into the precipitator.

Alternative IV. Venting of Fugitive Dust Sources

The raw materials handling and storage facilities could be enclosed and vented to baghouse systems. The advantage of these enclosures would be a more efficient control plan to reduce the potential for fugitive dust emissions from the plant. However, not every source could be enclosed because of the need for entry of the barge unloading clamshell and heavy equipment. Enclosed storage buildings would be a negative pressure and would require a very large fan and control system for adequate capture velocities throughout the structure. Since about 85 percent of the raw materials will be limestone and wet clay with a moisture content of about 22 percent, the covered storage area for the drier materials and the planned water spray dust suppression equipment are considered adequate so that additional reduction would not be necessary or economically feasible.

Rationale for the Proposed Action

The proposed use of baghouses on all the vented exhausts was based on the lack of practical alternatives for the numerous smaller sources at the plant and problems with an electrostatic precipitator for the larger sources. Additional fugitive dust controls would not be warranted on a cost-to-benefit basis.

NOISE

The construction of the plant facilities, which will take about 30 months, will cause some noise impacts in the surrounding area. Due to the type of equipment involved and tasks to be performed, there are no practical alternatives that can be taken. The noise aspects of the operational phase of the project are discussed below.

Proposed Action. Layout of Plant Site for Efficient Production

The proposed plant layout will place the kilns and other elements of the cement manufacturing process near the center of the developed site area. To the east would be the 20-meter (65-foot) high raw material storage piles and the 90-meter (300-foot) greenbelt, and to the west would be the parking area, office, wastewater settling basin, and undeveloped land. Immediately north of the plant site are the marshland and 36.4-hectare (90-acre) wooded area. South of the site will be the 210-meter (700-foot) wide ship channel waterway.

This layout reflects the latest of many previous designs and serves to reduce somewhat the noise generation characteristics of the site while not reducing the functional requirements of the facility.

Alternative I. Plant Layout to Minimize Noise Impact

An optional layout in terms of noise would involve locating the major noise-producing elements as far to the west as possible. The raw material storage piles, and possibly other noise barriers, could be located to provide maximum buffering of noise effects to the east, south, and north.

Rationale for the Proposed Action

The proposed action does not differ greatly from Alternative I in that the raw material storage piles will provide a substantial reduction of noise effects to the east, the direction in which the most sensitive land uses will be located. No alternatives providing greater noise protection are considered feasible in terms of process flow and other site requirements.

The proposed plant layout (see Appendix A) was chosen as the most practical use of the rather confined facility site considering a balance of ecological and noise factors. However, the design consultants are continuing their study to determine the noise reduction effects of layout and equipment changes. If specific types of equipment are determined to generate lower noise levels, have practical operating requirements, and be cost-effective, they will be used.

SOLID WASTE

Proposed Action. Landfill

The proposed plant construction and operation will generate industrial solid wastes that will be transported to the Irvington Landfill for disposal.

Alternative I. Burial On-Site

The construction and operation wastes could be buried on the property. Since most of the waste will be suitable for fill, this alternative would merely raise the elevation of a portion of the property.

Alternative II. Burial Off-Site

The wastes, except the putrescible and leachable wastes, could be used as "fill" for an off-site area. The wastes could be transported to the site on an as-needed basis.

Rationale for the Proposed Action

All three methods of disposal are environmentally sound. The use of the Irvington Landfill would be the easiest and most practical since both the putrescible and "fill" type wastes could be handled in the same vehicle. However, as mentioned in the impacts section, there will be a slight trade-off since the areas will tend to reach capacity faster.

On-site burial would be achievable but not very practical due to the lack of available land at the plant site and the high water table in the area. In addition, operation of a private industrial landfill is not a desirable action from an environmental viewpoint as proper disposal could be better achieved on a regular basis by trained operators at a public landfill.

The method of off-site burial, while not the proposed action, is still a viable action if an acceptable area could be found. This alternative could not be used for the putrescible and leachable wastes for the same reasons previously mentioned for an on-site landfill.

The planned use of the Irvington Landfill provides an environmentally sound disposal method and is the most practical choice of the three options.

Proposed Action. Disposal of Vegetative Wastes

The land-clearing wastes will be burned, chipped for mulch, or taken to the Irvington Landfill for disposal. The amount of wastes that will be disposed by each method will be determined during the construction period. All of the wastes could be disposed by any one of these methods without significant environmental impact (see Appendix C, Impacts). The alternatives are to cut the wastes for firewood, to sell them to a pulp mill or a waste wood boiler, or to bury them on the plant site.

Alternative I. Use as Firewood

The land-clearing wastes would be cut for fireplace-size logs and kindling and either sold or given away. The action would require smaller-sized pieces than would be used in the air-blower type pit burner and would require extra time and manpower. In addition, hauling the wastes to a more accessible location would probably be necessary to provide public access to the wood.

Alternative II. Selling Wastes for Use in a Pulp Mill or Waste Wood Boiler

The majority of the trees are from the remnant longleaf pine forest and should be of the size that could be cut and sold to several of the nearby pulp mills or waste wood boilers. Additional time, labor, and expense for cutting and transportation is expected not to be offset by any monies received for the wood.

Alternative III. On-Site Burial

The land clearing wastes could be buried on-site in an area that would not be developed for plant operations.

Rationale for Proposed Action

The first two alternatives are practical actions that could be utilized. However, their principal problem, which is shared somewhat with the proposed chipping and landfill (off-site), is the extra time and expense required to completely dispose of the vegetative wastes. These alternative actions are difficult to defend since the burning of the wastes would be conducted in an efficient manner and performed under a permit from the local health department. Any smoke generated would be less than that of typical open burning and would have a short-term impact.

The on-site burial alternative would cause a soil stability problem when the wood decays and forms a subsurface void. In addition, the land area needed to bury the waste would require clearing. Due to the lack of available dry land, the wastes would probably be buried on the area north of the marshland which is presently planned not to be developed.

In summary, the three proposed methods of disposal of the land-clearing wastes are probably more easily accomplished than any of the alternatives. Of all the proposed actions and alternatives, the controlled burning of the wastes would be the most practical but would have a slightly higher environmental impact than the other actions (except on-site burial). However, the significance of this greater environmental impact is considered to be low.

SANITARY WASTES

Proposed Action. Regional Sewage Treatment Plant

It is proposed that during operations the municipal system be used to deliver wastewater to the McDuffie Island sewage treatment plant.

Alternative I. On-site Treatment During Operations

A septic tank and absorption system sufficient to serve the 135 operating personnel would require a large land area and periodic maintenance. A package treatment system would require very little space, but a qualified operator would be needed, and effluent would be discharged to the ship channel or to marshland.

Rationale for the Proposed Action

The use of the municipal system during permanent operations is the preferred environmental alternative because it requires the least involvement by cement plant personnel and is the most satisfactory method of waste treatment and disposal.

PLANT WASTEWATER

Proposed Action. Settling Basin and Discharge to the Ship Channel

A settling basin is planned for collection and treatment of cooling water blowdown, stockpile and oil tank runoff, and wastewater from various washdown areas. The effluent would be discharged to the ship channel.

Alternative I. Settling Basin with Effluent to the Marshes

The freshwater marshes to the north of the plant site could receive the treated effluent from the settling basin. This alternative would not have a discharge directly into the ship channel and would achieve some additional sediment removal from the marsh prior to flowing into the channel on the east side of Dauphin Island Parkway.

Alternative II. Common Outfall in Mobile Bay

A common outfall for wastewaters from the Theodore Industrial Park has been proposed by the Board of Water and Sewer Commissioners of the City of Mobile. A pipeline would carry wastes from a holding pond at the industrial park to an outfall about 5.6 kilometers (3.5 miles) into Mobile Bay (see Figure E.2). An Environmental Impact Statement is presently being prepared prior to the U.S. Army Corps of Engineers' final decision on an application for construction of this pipeline.

Ideal Basic Industries could use the proposed pipeline for the discharge of wastewaters except general stormwater runoff.

Rationale for the Proposed Action

The planned treatment of wastewaters to be discharged to the ship channel has been designed to provide an effluent quality better than the limits specified in the NPDES permit (see Permit and Approval section of the Summary Document), and the stockpile runoff has been shown to be non-toxic (Environmental Science and Engineering, Inc., 1977). For the effluent from the cement plant, discharge to the marsh, use of the common outfall pipeline, and discharge to the ship channel are all environmentally acceptable alternatives. Thus, Ideal Basic Industries

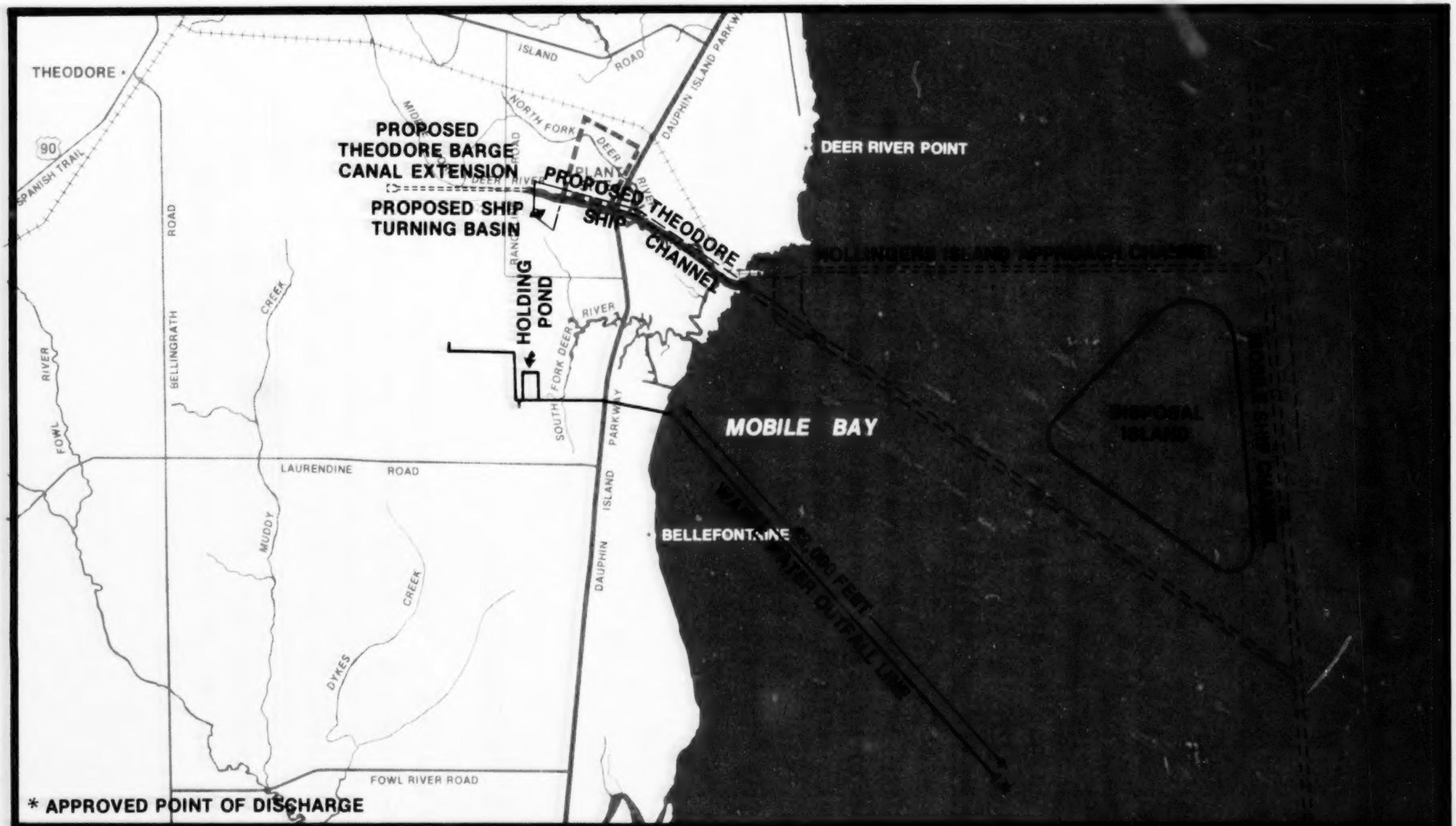

THEODORE
SPANISH TRAIL
90
ISLAND
ROAD
MIDDLE
NORTH FORK
DEER
RIVER
PLANT
DAUPHIN ISLAND PARKWAY
PROPOSED
THEODORE BARGE
CANAL EXTENSION
PROPOSED SHIP
TURNING BASIN
PROPOSED THEODORE
SHIP CHANNEL
DEER RIVER POINT
HOLLINGERS ISLAND APPROACH CHANNEL
HOLDING
POND
SOUTH FORK DEER
RIVER
BANGOR ROAD
DAUPHIN
ISLAND
PARKWAY
MOBILE BAY
DISPOSAL
ISLAND
MOBILE SHIP CHANNEL
BELLEFONTAINE
000 FEET
WASTEWATER OUTFALL LINE
BELLINGRATH
ROAD
CREEK
MUDDY
LAURENDINE
ROAD
CREEK
DYKES
FOWL
RIVER
FOWL RIVER ROAD
* APPROVED POINT OF DISCHARGE

Figure E.2
PROPOSED WASTEWATER OUTFALL IN MOBILE BAY

SOURCE: Board of Water and Sewer Commissioners of the City of Mobile, 1977.
Environmental Science and Engineering, Inc., 1977.

0 2
SCALE IN KILOMETERS

N

REGION IV
U.S. ENVIRONMENTAL PROTECTION
AGENCY ENVIRONMENTAL IMPACT
STATEMENT FOR IDEAL BASIC INDUSTRIES

PROPOSED CEMENT MANUFACTURING
PLANT THEODORE INDUSTRIAL PARK
MOBILE, ALABAMA

has chosen one of several possible alternatives that are relatively equal in terms of environmental considerations.

STORMWATER RUNOFF

Proposed Action. General Runoff Catchment Area--Discharge to Marsh

Natural drainage of most of the plant site is to the north, into the marshes. It is proposed that general runoff during construction as well as during operations be drained into a 2-hectare (5-acre), bermed area to the north of the site. This area would discharge into the freshwater marshes bordering the North Fork Deer River. The natural function of the vegetation in the basin and marshland will reduce the organic and solids loading of the runoff. The runoff quantity will be about double that which naturally drains to the marsh (due to greater area and less retention and percolation). This system will contain about 50 minutes of a 10-year, 1-hour storm and is considered consistent with the best management practices for stormwater control.

Alternative I. General Runoff Basin--Discharge to Ship Channel

The plant site could be drained to have the general runoff collect in a catchment area, probably along the waterfront. The area would contain the first flush of the runoff, then overflow to be discharged into the ship channel. This alternative is similar to the proposed action but with a different receiving body of water. A possible benefit of this scheme is to promote a greater flushing action in the channel due to the addition of an expected average daily flow of 910,000 liters (240,300 gallons) from the runoff.

Alternative II. General Runoff Basin--Discharge to Both the Marsh and Ship Channel

A single or multiple basin system would be designed to collect the general stormwater runoff, but would discharge to both the marsh and ship channel. This alternative would possibly promote a better flushing action in the channel while effectively maintaining the natural flow quantities into the marshland.

Rationale for the Proposed Action

The location or locations at which stormwater runoff from the plant site is discharged is an important issue because of the nature of existing water quality problems in the industrial park area. Degraded conditions in the barge canal/ship channel are due in large part to the lack of adequate flow in the waterway.

Drainage of all or part of the storm water from the proposed plant site into the ship channel, as provided in the last two alternatives, might provide additional flushing action and dilution of existing pollutant loads.

The proposed action of utilizing a catchment area north of the plant site and having the discharge flow through the freshwater marsh would provide some reduction of turbidity and suspended solids and would not decrease the quantity of storm water entering the marsh.

Alternative I would provide the same degree of treatment in the catchment area, but would not utilize the additional filtration of the marshland vegetation. This alternative would require redesigning the plant's drainage and modifying the present plot plan in order to locate the catchment area near the waterfront. An adverse impact of this action would be the probable shrinkage of the marshland due to a reduction of the runoff it is presently receiving.

Alternative II, splitting the discharge to both the freshwater marsh and ship channel, would provide adequate treatment of the discharges while not reducing the base flow into the marsh area. Similar modification to the facility drainage and layout, as mentioned for Alternative I, would be necessary.

From an environmental viewpoint, the proposed action and Alternative II are basically equivalent, while Alternative I would be less desirable because of its effect on the freshwater marsh. However, the two alternatives would require a different catchment area location somewhat closer to the ship channel so that the discharge to the channel would flow by gravity.

The proposed action is one of the better environmental designs for providing best management practices in treating general stormwater runoff from the plant site and would not require redesigning the facility layout and drainage.

OIL SPILLS

The 380,000-liter (100,000-gallon) fuel oil tank will be aboveground and will have a containment berm capable of holding all the oil in case of a tank rupture. The alternative of storing this amount of oil in an underground vessel is considered impractical and is therefore not assessed.

DREDGING

The construction of the docking facility will require about 500,000 cubic meters (650,000 cubic yards) of dredging. It is anticipated that this material will be disposed in one of the U.S. Army Corps of Engineers spoil disposal areas. There are no practical alternatives to these actions.

LAND CLEARING AND GRADING

About 20 hectares (50 acres) of the 34.4 hectares (85 acres) to be developed on the site will be cleared. This action has no practical alternatives.

PLANT ACCESS

Proposed Action. Access to Island Road North Along Western Plant Boundary

The proposed action, as stated in Appendix A, Project Description, is for an access roadway to be constructed from Island Road (Hamilton Boulevard) to the facility site.

In addition, a railroad spur will be constructed from the State Docks Railroad to the site. These two roadbeds will parallel the western boundary of the property and will form a corridor about 47.2 meters (155 feet) wide through the existing vegetation and freshwater marsh and across the North Fork Deer River. The roadway will have a 15-meter (50-foot) bridge across the river and fill in a 150-meter (500-foot) section of the marsh. The railroad spur will have a 170-meter (560-foot) long trestle across the river and marsh.

The alternatives to this access route are access from Dauphin Island Parkway and bridging the roadway across the freshwater marsh. An additional action could have been access from Rangeline Road along the State Docks Railroad corridor, but because of the present plans to upgrade this road to a divided highway with an above-grade crossing of the railroad line, this action is not practical.

The alternative of using the Airco, Inc. access roadway is not feasible due to various problems with the two industries using the same route (i.e., a strike at one would close the other plant, the roadway would have to be upgraded for heavier class service, liability, security requirements, and ownership claims). In addition, Ideal Basic Industries has not been able to obtain permission from Airco, Inc., for use of its roadway.

Alternative I. Access from Dauphin Island Parkway

The section of the Dauphin Island Parkway south of Island Road (Hamilton Boulevard) could be utilized several different ways for access to the plant site. First, if permission could be obtained from the Alabama State Docks Department for use of the road along their railroad spur, access to the plant site could be provided anywhere along the northern property line. Any of these routes would divide the marshland into two sections.

Second, access from Dauphin Island Parkway could be at a point south of the North Fork Deer River and associated brackish marsh. This route would cross the undeveloped greenbelt and would necessitate upgrading the existing bridge over the North Fork Deer River.

The use of either of these corridors from Dauphin Island Parkway would necessitate extensive roadway construction for the state-owned parkway to handle the anticipated truck traffic.

Alternative II. Bridging of the Marsh

The entire freshwater marsh could be crossed by an approximately 165-meter (550-foot) long roadway bridge. This bridge would be within the same corridor as the proposed action and does not involve the railroad structure. The additional cost for this extra bridging has been estimated to be about $300,000.

Rationale for the Proposed Action

Access from the Dauphin Island Parkway and across the marsh would involve greater disturbance than the proposed action and is therefore undesirable. Access directly from the Dauphin Island Parkway (south of the marsh) is feasible but would require the upgrading of the state-owned bridge and roadway. An extensive redesigning of the facility site would be required to utilize this access route.

The proposed action would fill in approximately 0.2 hectare (0.5 acre) of the freshwater marsh but would bridge the North Fork Deer River so that the water flow would not be disrupted. The alternative of bridging the entire freshwater marsh would effectively stop direct sunlight from reaching the vegetation beneath the structure. This action would have an impact upon the marsh; however, it would not be as great as the proposed action.

The area to receive the fill is adjacent to the Airco roadway, which was constructed with fill and several small culverts across the river and marsh. The zone of influence of ancillary effects of the existing roadway on the freshwater marsh (weedy vegetation and gradual silting) would probably be extended by either the proposed access roadway or Alternative II.

The proposed action, while not the best environmental alternative, is considered to be acceptable. Based on the difference in impacts and construction costs, the alternative of bridging the entire marsh would not be as practical as the proposed action.

QUARRY SITE ALTERNATIVES

NO-ACTION ALTERNATIVE

FUTURE LAND USE

Whether or not the proposed quarrying operation is conducted, the quarry site area will be converted almost entirely to improved pasture by 1992. Only land along the Alabama River and north of Thompson Mill (Marshalls) Creek will remain in natural vegetation. Therefore, all of the environmental changes linked to land clearing and cattle grazing will still occur without the limestone quarry project.

Land use conditions in the area surrounding the quarry site are essentially static, except for construction of the Parsons and Whittemore Pulp Mill, 11 kilometers (7 miles) north of the site. Since the quarry operation is not expected to have significant impacts on land use, land value, or general amenity, the no-action alternative would resemble the project alternative in terms of off-site conditions.

AIR QUALITY

Air quality in the vicinity of the quarry site will change slightly from present levels due to the operation of the Parsons and Whittemore Pulp Mill. An environmental assessment study for the proposed mill (Associated Water and Air Resources Engineers, Inc., 1975) showed that air emissions from the proposed mill would not exceed:

Sulfur Dioxide: Annual Average: 1 ug/m^3
24-Hour: 8 ug/m^3
3-Hour: 71 ug/m^3
Total Suspended Particulate Matter:
Annual Average: 4 ug/m^3
24-Hour: 33 ug/m^3

These maximum concentrations would occur within 2 kilometers (1.2 miles) of the pulp mill. Since the quarry site is approximately 11 kilometers (7 miles) from the mill, sulfur dioxide and TSP levels at the quarry site will be much lower than those listed above. Therefore, 1992 sulfur dioxide and TSP levels will probably not be significantly different from existing baseline levels, provided that other major emission sources do not locate in the area.

NOISE

Present sound levels at the quarry site are affected only by wildlife, natural phenomena, and a small increase in barge traffic on the Alabama River and in vehicular traffic on Stockton Road (Monroe County Road No. 1). No significant changes from present conditions are expected in the absence of the quarrying operation, except very localized noise level increases due to livestock grazing and agricultural land management.

WATER RESOURCES AND AQUATIC ECOLOGY

Much of the property belonging to Ideal Basic Industries has already been timbered, and conversion to pasture is occurring at a rapid rate.

Based on the effects on Hollinger Creek, the changes in Thompson Mill (Marshalls) Creek by 1992 will include: (1) elevated water temperatures because of reduced forest canopy; (2) increases in specific conductivity, total dissolved solids, and alkalinity as a result of higher rates of soil leaching and surface erosion; and (3) higher ammonia and organic nitrogen levels due to erosion and to cattle wastes. The worst effects of erosion may be short-term in nature, but continuing degradation can be expected as cattle loading rates increase. These changes will have little effect on Randons Creek because only 3 percent of its watershed lies within the quarry site. However, some water quality degradation is expected due to expansion of the Frisco City urban area and conversion of forest to agricultural land.

No change in the hydrologic regime of the Alabama River is expected before 1992, since there are no planned navigation or flood control projects. Some increased sediment loads to the Alabama River may result from logging and land clearing in tributary watersheds, but these influences on the river should be negligible.

Silt deposition into the streams may bury present root, rubble, sand, and gravel habitats and create soft bottoms and thus cause a major change in the stream fauna. Such marked changes would require continual heavy erosion and are probably not likely. Initial severe erosion during and immediately following clearing could cause substantial mortality, and community recovery could require a couple of years. Clearcutting trees along the stream banks will eliminate leaf-fall, an important input to forest streams, and will expose the stream to direct sunlight. These are major alterations and probably will lead to major faunal changes. Heavy nutrient loading from cattle wastes and from any fertilizers applied to the pastures would favor a restricted fauna of pollution-tolerant species. Continual bottom disturbance by cattle would reinforce this trend.

TERRESTRIAL ECOLOGY

With continued conversion of forest to pasture, there will be a reduction in the overall animal diversity of the site, especially of forest and edge species; for example, the present decline of turkey and squirrel populations will continue. There will be, however, an increase in grassland species, such as mice, meadowlarks, and grasshopper sparrows.

The attributes which will become more pronounced as the area is further cleared include poor nutrient conservation, simplified food chains, low diversity of both fauna and flora, and greater microclimate variation.

SOCIOECONOMIC CONDITIONS

In contrast to past decades, the economy and population of Monroe County are presently expanding. As discussed earlier in the description of baseline environment, growth is expected to continue due to a variety of factors. This development is expected to be well-balanced and largely favorable in terms of labor force opportunities and overall community impact.

SITE LOCATION AND DEVELOPMENT

ALTERNATIVE SITES

Ideal Basic Industries (1973) searched the Gulf Coast area for a source which could supply 1.9 million metric tons (2.1 million tons) per year (dry) of limestone suitable for cement manufacturing. Most potential sites were rejected because the limestone was of unsuitable chemical composition; mining would be difficult; the site could not be purchased; or transportation costs would be excessive. The two best locations were the Gaillard Tract and a site near Crystal River, Florida. Final choice of the Gaillard Tract was primarily an economic decision based upon proximity to the Theodore Industrial Park and barge access to the tract.

The Gaillard quarry is also favorable in that:

1. Limestone is relatively close to the land surface;
2. Dredging is not required for construction of loading facilities; and
3. Danger of flooding is much less than for most other sites having water access.

ALTERNATIVE SOURCES OF CALCIUM CARBONATE

The principal ingredient of cement (about 80 percent) is a calcareous substance such as limestone. The alternatives to limestone which have been considered for the proposed project include oyster shells and aragonite.

Oyster shells provide the calcium carbonate for the existing Ideal Basic Industries cement plant in Mobile, but are not a feasible source for the projected plant. The supply of shells is limited in Mobile Bay and the new plant alone would require tripling the usage rate.

There are additional oyster shell reserves off the Louisiana coast, but to dredge and transport these reserves to Mobile would require additional costs. Also, the dredging of oyster shells has become a subject of increasing environmental concern.

Aragonite is precipitated from sea water as a high purity granular limestone sand. The only economically recoverable deposits known to exist are those in the Bahamas. These deposits are geologically young, which accounts for their high chemical product purity. They are being dredged off Ocean Cay by Marcona Ocean Industries, a U.S.-owned corporation. Aragonite tends to have a high chemical reactivity and would be attractive in terms of process operations. However, several disadvantages outweigh this single advantage. First, the aragonite deposits are owned by a foreign government, and it may be necessary to maintain stockpiles larger than would be appropriate for a domestic source. Runoff from and rehandling of these stockpiles could have adverse environmental effects. Second, because the source is 1,300 nautical kilometers (800 miles) from the plant, Ideal Basic Industries would be subject to increases in ocean freight rates. This could significantly affect the profitability of the proposed plant. Third, being marine deposits, aragonite materials contain chlorides, and these must be removed prior to use in cement manufacturing. The washing operation could generate a wastewater flow of 2 to 13 million liters (0.5 to 3.5 gallons) per day. This would make large demands on local freshwater resources, and would affect existing water quality in the receiving body of water.

Finally, purchase of the aragonite entails unacceptably high risks of disruption of supply and of price fluctuations. For all the above reasons, it was considered preferable to obtain limestone from a domestic source under the control of the cement company.

The study of site locations and of alternative sources of calcium carbonate was conducted by Ideal Basic Industries. Although the study was not performed specifically for this EIS, the selection of the quarry site has been reviewed and found to be environmentally acceptable.

PROCESS ALTERNATIVES

The process alternatives for the quarry are somewhat restricted due to the nature of the process--surface mining, only one raw material, no major energy supplies other than purchased electricity, and the simple deployment of conveyors, rock breakers, and barge-loading equipment. The only process alternative relates to the use of a centrally-located rock crusher.

Proposed Action. Movable Crusher

Front-end loaders will load the ripped material and transport it to a portable breaker (crusher) in the quarrying area. The limestone will be crushed in the breaker and transported by conveyor to the storage pile.

Alternative I. Centrally-Located Crusher

An alternative arrangement could be the placement of a permanent breaker adjacent to the storage pile, serviced by a conveyor or by dump trucks traveling from the quarrying area. This arrangement would eliminate the need for a portable crusher and would also decrease the number of conveyors necessary. However, a centrally located crusher would increase truck traffic on the site, as well as increasing fugitive dust levels. Additional haul roads would also be required.

Rationale for Proposed Action

The arrangement planned by Ideal Basic Industries requires the least amount of heavy equipment and is environmentally and economically advantageous.

ABATEMENT MEASURES

AIR QUALITY

The proposed construction activities will generate smoke emissions from burning of the land-clearing debris and fugitive dust from use of heavy equipment and clearing operations. The alternatives to the burning activities are discussed in the Solid Waste section.

The operation of the quarry and its conveyor systems will cause some additional emissions of fugitive dust.

The dust from the construction and quarrying is uncontrollable except for application of water on an area basis. Actually, the moisture content of the soils and limestone is rather high and would naturally reduce the emission level of dust. There are no practical alternative actions that could control these emissions. However, the conveyor and loading facilities could be enclosed and vented to a scrubber or baghouse system.

Proposed Action. Dust Suppression System on Conveyors and Barge Loading Facilities

The conveyor and barge-loading facilities will utilize a water spray dust control; in addition, the barge-loading spout will have a telescoping boot to reduce the dust generated. The water spray systems will be used on an as-needed basis, since the material will be naturally moist (approximately 22 percent moisture content).

Alternative I. Enclosing and Venting to a Higher-Efficiency Control System

The dust-generating portions of the conveyor and loading systems, the drop and transfer points, could be enclosed and vented to small scrubbers or baghouses.

Rationale for Proposed Action

Enclosing the drop and transfer points would require numerous control devices throughout the quarry facility. While they would achieve a higher degree of dust removal than water sprays, their costs would not be warranted since the impact of the proposed system is already considered to be low.

NOISE

The construction and operation of the quarry will cause an increase in noise levels on-site. Due to the nature of the heavy equipment involved and their functional tasks, there are no practical alternatives to the proposed action that would reduce the noise generated.

WASTES FROM LAND CLEARING

Proposed Action. Burning and Chipping Land Clearing Wastes

It is proposed that, after clearing the 40-hectare (100-acre) construction site, all brush and branches and those trees not sold as timber be burned or chipped for mulch. The use of an air-blower type pit burner is expected to produce better combustion efficiency and less smoke than ordinary open burning. The mulch would be used for erosion control and revegetation of disturbed areas.

Alternative I. Landfill

All vegetative wastes that are planned to be burned or chipped could (alternatively) be brought to the Monroe County Landfill for disposal; however, this would require a round-trip distance of at least 80 kilometers (50 miles) per load.

Alternative II. On-site Disposal

Brush and trees could be buried or piled in areas not to be quarried, thus eliminating all burning.

Rationale for Proposed Action

As discussed in Appendix C, Impacts, smoke emissions from burning land-clearing wastes would have only a very short-term impact in the rural area surrounding the site.

Alternative I would involve costly hauling of the trees and brush to the landfill. Once there, the wastes would be buried and would thereby use a portion of the available land.

The second alternative, by disturbing additional areas and creating unstable surface contours, would render the land unsuitable for pasture or other use until the wastes have decomposed and the land surface has stabilized.

The proposed action was chosen because it is the most practical for the construction contractor to accomplish, has only short-term impacts, and does not put a stress on local landfilling operations.

SOLID WASTE

Proposed Action. Disposal at an Approved Landfill

It is proposed that the solid wastes (except vegetation wastes) generated during both construction and operation be disposed at the Monroe County Sanitary Landfill.

Alternative I. On-site Disposal

Because of the large size of the quarry tract, an on-site disposal area could be found where re-excavation would not be a problem. Since the wastes will not be toxic, their disposal does not present any ecological problems.

Rationale for the Proposed Action

It is not efficient for Ideal Basic Industries to maintain a sanitary landfill because commitment of heavy equipment and labor to the daily covering required for a sanitary landfill would be more expensive than off-site disposal of only 4.2 metric tons (4.5 tons) of solid wastes per year.

PROCESS WASTEWATER/GENERAL STORMWATER RUNOFF--CONSTRUCTION AND OPERATION

Proposed Action. Clarification Basins

The construction plan calls for at least three clarification basins to contain stormwater runoff and to reduce the suspended solids concentrations prior to discharge to the Alabama River or to Thompson Mill Creek.

Alternative I. Vegetation Buffers

The first alternative is the preservation or establishment of vegetative buffers on the uplands and on downstream drainage courses. These buffers would stabilize the soil and trap sediment. The advantages of this alternative include: (1) low relative cost of development; (2) no operational requirements; (3) low maintenance requirements; and (4) capture of sediment near its source. The disadvantages are: (1) decreased ability to control sedimentation; and (2) decrease in usable land for quarrying.

Alternative II. Quarry Pit Storage

The second alternative is the use of large quarry excavations as sediment basins. The advantages of this alternative include: (1) large storage volumes; (2) little need to remove trapped sediment; and (3) little construction required other than normal quarry excavations. The disadvantage is the potential difficulty of drainage and/or the pumpout requirements for discharging to a receiving body of water.

Rationale for Proposed Action

Vegetation buffers would not meet the stringent discharge control criteria on a daily basis. Since the limestone deposits extend as deep as 30 meters (100 feet) below ground level, adequate vegetation buffers would be difficult to establish and maintain on the subsurface soils. The proposed clarification basins are designed to meet all discharge requirements and can be used during both construction and operational phases. The alternative of establishing pit storage is applicable only to operations after 5 to 7 years of quarrying when adequate pit area would be available. The use of quarry depressions for expanding the water storage capacities is being studied by the design consultant.

Therefore, the use of the clarification basins is considered the most practical solution to reduce the potential environmental impacts of surface runoff from disturbed land areas on a continuous basis.

WATER USAGE AND SANITARY WASTES

Proposed Action

The potable water supply will be a deep well driven on the facility site. The sanitary waste disposal system will be a septic tank and soil absorption system to serve the 19 employees. Both systems must be approved by the Monroe County Health Department. There are no practical alternatives to the water supply system and sewage disposal system due to the limited number of employees that would be served.

ECOLOGICAL SYSTEMS

The facility's construction and operation will affect about 80 percent of the 1,633 hectares (4,035 acres) during its projected life of 50 years. The disturbed area will be reclaimed to pastureland after the layer of limestone has been removed. Since this area is presently being converted to pastureland, the significance of the quarrying activities will be minimal. There are no practical alternative actions to the proposed quarrying of the property other than the no-action alternative described earlier.

RECLAMATION ALTERNATIVES

Proposed Action. Reclamation to Pastureland

Reclamation to improved pasture is specified in the lease agreements between Ideal Basic Industries and Mr. McWilliams. Two potential alternative uses of the land owned by Ideal Basic Industries would be: (1) reclamation to timberland, and (2) development of part of the site as an industrial area.

Alternative I. Reclamation to Timberland

In upland areas, pine plantations could be established. They would provide timber and also habitat for such game species as quail, rabbit, and deer. Practices which could be employed to produce better forage and increased growth of pines would include site preparation, thinning, and winter burning. It has been suggested that livestock can graze within a pine plantation if forage is provided, but this technique has had limited success.

Alternative II. Industrial Park

The Gaillard tract is one of the most favorable industrial sites within the Claiborne/Perdue Hill area because it has water access and lacks flood hazards. This alternative might provide an attractive long-term opportunity that is consistent with ongoing quarrying operations. Monroe County might receive substantial economic benefits, without significant impacts upon existing communities.

Rationale for Proposed Action

Reclamation to timberland might be preferable to pastureland in terms of water quality and ecological conditions, but would involve a lower economic value and productivity of the land as a natural resource. Industrialization of the area could have negative environmental impacts. The decision for pastureland provides more flexibility in the long run since timbering, agriculture, or some other land use could easily be established at a later time on the gently rolling pastureland.